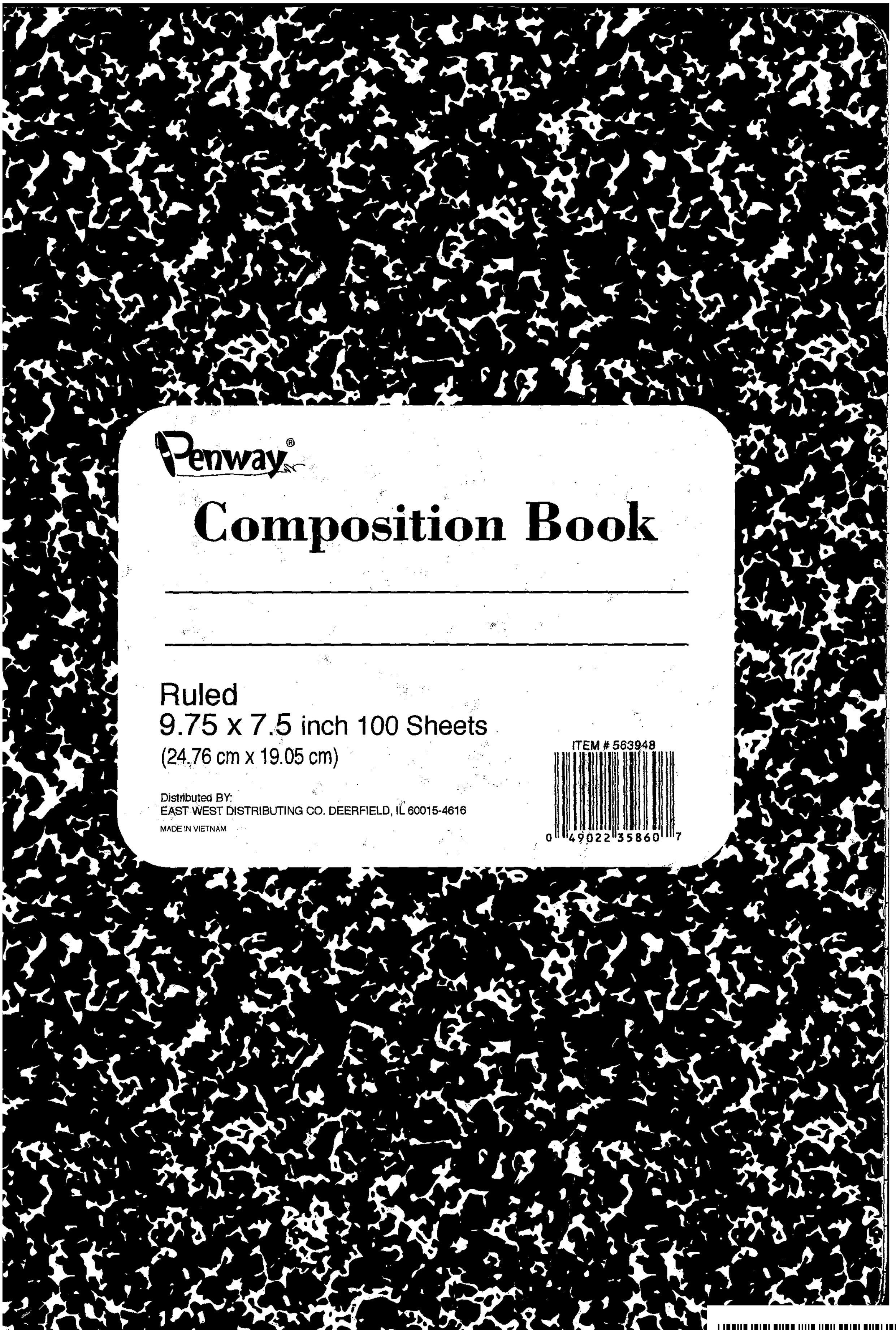
Penway®
Composition Book
Ruled
9.75 x 7.5 inch 100 Sheets
(24.76 cm x 19.05 cm)
Distributed BY:
EAST WEST DISTRIBUTING CO. DEERFIELD, IL 60015-4616
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4/1/09 EVAL 0409-01

DAN BOWMAN

TECHNISAND

WANT TO MOVE TO NEWPARK.

1 TRL EVERY 5-6 MONTHS

PH · 10.35

FP > 140 DEG F

NO VISIBLE OILS.

4/14/09 EVAL 0409-16 ~~No. 12 UNIT~~

NCRA, McPHERSON, KS

625 g SPRUNG

BOTTLE TARE · 233.1

BOTTLE + Sx 282.0

Sx. WT 48.9

% CRUDE ACID = $\left[48.9/625\right] \times 100$ = 7.8 WT%

SG - 1.190

TITRATION -

.4655 g

TO pH 4 - 19.1 TO pH 7 - 18.4 ml

16.4 wt% NaOH

4/15/09 EVAL 0409-15B

EXXON, BATON ROUGE - NAP CAUSTIC - NO. 12 UNIT

SG - 1.040

TA - (TO pH 4.0) = $(.1 \times 4.6 \times 4)/.4327 = 4.3\%$ NaOH

WET CRUDE (NAP ACID)

WT SPRUNG - 224.3 + 227.8 + 244.5 + 104.7 = 801.3

WET CRUDE - BOTTLE TARE 232.9

BOTTLE + SX 258.0

SX WT 25.1

WET CRUDE, WT % = $[25.1/801.3] \times 100$ = 3.1

EPAHO113000976

4/15/09

EVAL 0409-15C - No. 16 UNIT

EXXON, BATON ROUGE - NAP CAUSTIC?

S6- 1.110 TA= [.1×18.4×4]/.9000 = 8.2 WT% NaOH

WET CRUDE

WT SPRUNG = 294.2 + 216.8 + 264.4 = 775.4 g

BOTTLE TARE 232.9

BOTTLE + Sx 263.7

Sx. WT. 30.8

WET CRUDE = 4.0 WT %

4/15/09 EVAL 0409-15A

EXXON, BATON ROUGE - NAP. CAUSTIC

NO. 2 UNIT

WET CRUDE

WT SPRUNGS. 303.9 + 218.5 + 211.8 = 734.2

BOTTLE TARE 233.1

BOTTLE + SX 253.0

SX WT 19.9

WET CRUDE = 2.7 WT %

5/8/09 T-606 CRESYLATE TESTING

A SAMPLE OF PACES CRESYLATE FROM T-606 WILL BE SPRUNG OUT TO A pH OF 4 WITH ALKY H_2SO_4. VOLUME % ACID REQUIRED WILL BE DETERMINED. CA IN BRINE WILL BE DETERMINED AND AMOUNT OF BLEACH REQUIRED TO REDUCE TO ~2000 ppm DETERMINED.
TOTAL CRESOLS LIMIT IS 200 ppm. FOR NON-HAZ.
I WILL ALSO DETERMINE WT% WET CRUDE.

CRESYLATE -
SG - 1.150
NaOH - WT. .5750 18.6 ml 0.1 N HCl
$NaOH = (.1 \times 18.6 \times 4)/.5750 = 12.9$

SPRINGING -
CRESY WT. 217.7g
21.2 ml OF ACID; BREAKS OUT ~ pH 3
BOTTLE TARE 233.5g
BOTTLE + CA 272.8g
} 175 ml OF BRINE PRODUCED
CRUD ACID - 39.3g
WET CRUDE = 18.1%

5/11/09 CRESYLATE - CONT'

THE BRINE IS REMOVED AND TESTED FOR CRESYLICS.
A 1:1000 DILUTION GIVES A 7 ppm READING,
OR 7000 ppm.
A 12.5% NaOCl SOLUTION WILL BE USED TO
REDUCE CRESYLICS TO ~ 2000 ppm LEVEL.

A 30% (VOL) OF BLEACH REDUCES THESE
CRESYLICS TO 0.
A 10% BY VOL OF BLEACH REDUCES CRESYLICS TO ~3000 ppm
A 15% BY VOL OF BLEACH REDUCES CRESYLICS TO ~ 2000 ppm

Summary of Volumes
217.7 g / 1.150 = 189 mL OF CRESY - SPRUNG
175 mL OF BRINE PRODUCED = 92.6%
21.2 mL OF Alky ACID USED = 11% ACID ADDITION

So ∴ 30,000 gal OF CRESY WILL PRODUCE 6245 lbs
OF WET CRUDE ACID; GENERATING 27,780 gal
OF BRINE; NEEDING (@ 15%) 4167 gal OF BLEACH.
OR @ 10% BLEACH - 2778 gal OF BLEACH.
3300 gal OF Alky ACID NEEDED PER 30,000 BATCH.

5/11/09 CRESYLATE - CONT.

KIM SAYS OUR NEAT BRINE IS 34% CRESOLS. THIS BEING THE CASE, TOTAL PHENOLICS CAN BE NO GREATER THAN 588 ppm.

5/12/09

A 30% BLEACH ADDITION REDUCES CA TO ~ 400 ppm
A 25% BLEACH ADDITION REDUCES CA TO ~ 500 ppm.

EXTRACTION TO REDUCE PHENOLS
A 1:1 EXTRACTION WITH REAGENT TOLUENE REDUCES PHENOLS IN BRINE TO ~ 600 ppm

A 1:1 EXTRACTION WITH WATER WASHED RECOVERED OIL REDUCES PHENOLICS TO ~ 3500 ppm.

5/14 A 1:1 EXTRACTION OF NAP ACID BRINE WATER WITH TOLUENE REDUCES PHENOLS FROM ~ 3000 ppm TO ~ 400 ppm.

5/13/09 PACES PHENOLICS IN WASTE WATER

A SAMPLE OF NAP ACID BRINE WATER WAS TESTED AND FOUND TO HAVE ~ 3000 ppm PHENOLS.

A SAMPLE OF THE EXXON, BR SULFIDIC CAUSTIC WAS pH ADJUSTED AND HEATED TO REMOVE H_2S. PHENOLS ON WATER BRINE ARE 0. AS THE SAMPLE IS HEATED AFTER ACIDIFICATION, AN "OIL" LAYER FORMS ON TOP. NOT A FULL LAYER, BUT PARTIAL AMOUNT.

ODOR ISSUES

5/13/09 A 2:1 AND 1:1 NAP ACID H_2O : TRICHLOR HAS A VERY POOR ODOR, UNACCEPTABLE FOR CES.

A 5:1 S/S H_2O (ACIDIFIED & HEATED TO REMOVE H_2S) TO TRICHLOR HAS A GENERALLY ACCEPTABLE ODOR.

TREATED S/S H_2O HAS NO PHENOLS, ZN < 0.05 NI < 0.05, AND TOC = 1107 ppm. THIS WILL MAKE GOOD "EQUALIZATION" WATER.

EPAHO113000982

5/28/09

NAP ACID - TOTAL

A SAMPLE OF SPRUNG NAP CAUSTIC FROM TOTAL HAS BEEN TESTED. USING THE SPENT ALKY H_2SO_4, THE PH WAS ADJUSTED TO ~3 AND ALLOWED TO PHASE SEPARATE. BOTH PHASES GIVEN TO KIM.

BRINE SHOWS LOTS OF "ABNORMAL" FRONT END PEAKS WHEN RUN ON GC. PARA/META RATIO VERY UNUSUAL. NORMALIZED SHOT IS BELOW.

Phenol	6454.7	10.8
o-Cresol	7357.0	12.3
2,6-xylenol	4217.0	7.0
m-Cresol	5732.8	9.6
p-Cresol	16769.2	28.0
OEP	1788.0	3.0
2,4-xylenol	5922.0	9.9
2,5-xylenol	1887.5	3.2
PEP	2673.4	4.5
2,3-xylenol	2032.8	3.4
MEP	1488.2	2.5
3,4-xylenol	1853.9	3.1
3,5-xylenol	1668.7	2.8
	59845.2	

SHOT SHOWS 49.9% AS CRESOLS. OF TOTAL CA, 41% IS NOT REACTING WITH 4-NAP DUE TO PARA CONFLICT.

5/28/09 NAP ACID - TOTAL - CONT

ANOTHER SAMPLE PREPPED TODAY SHOWS ~2500 ppm CA IN BRINE. SO, IS THIS REALLY 2500/.6 = 4167 ppm TOTAL IN SAMPLE?

I WILL PREP ANOTHER SX. FOR KIM, USING REAGENT HCl. THIS WILL CHECK ON FRONT END PEAKS AND ALSO POSSIBLY MAKE CA ID EASIER IF ALKY ACID IS ADDING STUFF. IT WILL ALSO CONFIRM STRANGE P/M RATIO.

A DIESEL EXTRACTION (25:10) BRINE: DIESEL LOWER CA FROM ~2500 TO 750? - QUESTIONABLE -
A TOLUENE EXTRACTION (25:10) BRINE: TOLUENE REDUCES CA TO ~ 1000 ppm.
ADDING AN EQUAL VOLUME OF DIESEL DOES NOT REDUCE THE CA (22:22) - BUT TO ~ 1000 ppm

5/29/09 NAP ACID BRINE EXTRACTIONS

LOOKING FOR STEPS TO REMOVE PHENOLICS FROM NAP ACID BRINE. HCl SPRUNG NAP ACID BRINE SHOWS ~2500 ppm PHENOLS. A 2:1 SX: DIESEL LOWERS TO ~1200 ppm. ADDING A LITTLE BIT OF ROCK SALT REDUCED IT DOWN TO ~1000 ppm. SATURATED BRINE (EXCESS ROCK SALT) REDUCES TO ~ 750 ppm.

HAVING A HIGHER SALT CONCENTRATION HELPS. NEED TO NOW LOOK FOR THE BEST EXTRACTION SOLVENT.

ON LINE RESEARCH SHOWS MIBK (METHYL ISO-BUTYL KETONE), DIPE (DI ISOPROPYL ETHER)

USE METHYLENE CHLORIDE, SX. IS REDUCED TO ~ <400 ppm. A 2:1 SX: $MeCl_2$ RATIO USED.
A MIX OF DIESEL/MEK REDUCES DOWN TO ~400 ppm

LOOK FOR DUAL MIXTURES. THEN, EXTRACT AWAY PHENOLS WITH CAUSTIC FROM SPENT SOLVENT.

6/1/09 Nap Acid Brine Extractions

A mix of: 4 parts Diesel; 0.5 parts MEK; 2 parts $MeCl_2$ in a 1:1 extraction reduces brine to <300 ppm.

6/1/09 The Search for a Good Extraction Solvent

A sample of brine again prepared from HCl sprung Nap caustic. Phenolic are ~2500 ppm.

Solvent	Extraction Sx: Solvent	Phenols
Diesel 4; MEK 0.5; $MeCl_2$ 2	2:1	500
" " "	1:1	<300
Diesel 5; MeCl 2	2:1	1200
" "	1:1	700
Diesel 1; $MeCl_2$ 1	2:1	>>1200
Toluene 1; MEK 1	1:1	<100
Diesel 1; MEK 1	1:1	<200
Toluene 1; MIBK 1	1:1	<< 100 (actually ~50)
Diesel 1: MIBK 1	1:1	~50
Diesel 2: MIBK 1	1:1	100
Diesel 4: MIBK 1	1:1	~150
Diesel 10: MIBK 1	1:1	~400

6/3/09 EXTRACTION SOLVENT

SOLVENT	EXTRACTION SX: SOLVENT	PHENOLS
DIESEL 10 : MIBK 1	5:1	~1000
DIESEL 10 : MIBK 1	2:1	~700

I'M OUT OF NAP ACID BRINE SO WILL NEED TO MAKE SOME MORE; WHICH MEANS NEW PC VALUE. DIESEL : MIBK RATIOS AND EXTRACTION RATIO PINNED DOWN.

6/8/09 NAP ACID BRINE SOLVENT EXTRACTION

A NEW BATCH OF NAPHTHENIC CAUSTIC FROM CITGO WAS SPRUNG OUT WITH CLEAN LOOKING H_2SO_4 (NOT ALKY ACID OR CURRENT PLANT USE, BUT NOT REAGENT GRADE). TWO LITERS OF CAUSTIC WERE SPRUNG OUT, (MIXED THOROUGHLY) ALLOWED TO SETTLE IN A SEP FUNNEL, AND THE BRINE RECOVERED.

PHENOLS ON THE NEAT BRINE

$\sim 2.5 - 3 \times \frac{100}{10} \times \frac{100}{1} = 2,500 - 3000$ ppm

DEFINITELY NO GREATER THAN 3,000, BUT HARD TO GET AN EXACT VALUE WITH OUR TEST.

6/8/09 NAP ACID BRINE SOLVENT EXTRACTION TESTING

FIRST, I WILL FIND AGAIN THE BEST RATIO OF DIESEL:MIBK TO REDUCE PHENOLS TO <400 ppm USING A 1:1 EXTRACTION.

SOLVENT	SOLVENT:BRINE	PHENOLS
DIESEL-4:MIBK 1	1:1	$\sim 3 \times \frac{100}{2} = \sim 150$
DIESEL-5:MIBK 1	1:1	$\sim 3 \times \frac{100}{2} = \sim 150$
DIESEL 8:MIBK 1	1:1	$\sim 4 \times \frac{100}{2} = \sim 200$
DIESEL 9:MIBK 1	1:1	$\sim 5 \times \frac{100}{2} = \sim 250$
DIESEL 10:MIBK 1	1:1	$\sim 6 \times \frac{100}{2} = \sim 300$

FROM THE ABOVE A 9:1 OR 10:1 WOULD WORK FOR REDUCING CRESOL TO <200 ppm. EVEN IF ONE ASSUMES 50% CRESOLS, WITH P-CRESOL ~15%, A 300 ppm WOULD GIVE -
$(300 + 15\%) \times 0.5 = 172.5$ ppm.

THE NEXT STEP WILL BE TO SPIKE CA INTO THE SOLVENT TO CHECK ITS "% SPENT" LEVEL. A SAMPLE OF MERISOL FRA WAS OBTAINED, ALONG WITH ITS ISOMER DISTRIBUTION. IT WILL BE USED FOR THE "SPENTNESS" TESTING.

6/10/09 SOLVENT "SPENTNESS" TESTING

FOR THIS WORK, VARYING AMOUNTS OF CA WILL BE SPIKED INTO SOLVENT TO SEE ITS EFFECTS UPON ITS EXTRACTION CAPACITY. A 9:1 DIESEL: MIBK WILL BE USED.

SOLVENT : CA	SOLVENT MIX : BRINE	PHENOLS
10 mL : 0.1 mL	1:1	~600
10 mL : 0.4 mL	1:1	~2000
10 mL : 0.7 mL	—	—
10 mL : 1.0 mL	—	—

THE ABOVE DATA SHOWS THAT AT EVEN A 0.1/10 OR 1% LOAD, THE SOLVENT NEEDS REGENERATION. THIS IS ONLY 3-4 EXTRACTIONS. I WILL TEST THIS BY DOING CONSECUTIVE EXTRACTIONS IN A SEP FUNNEL AND TESTING THE EXTRATTED BRINE FOR PHENOLS. A LARGER SX, SAY 100 mL EA BRINE AND SOLVENT, WILL BE USED.

6/3/09

ENVIRO SOLUTIONS- 87032

PINK SOLUTION (WHICH CAN BE DE-COLORRED WITH ACTIVATED CARBON), H_2O SOLUBLE, D>1; NOT MISCIBLE W/ BLACK OIL. SMELLS LIKE AN ACETATE. pH ≈ 4. FP ~ 80°F

%	OH	POT
IBP	~~91~~ 77	~~77~~ 91
5	81	93
10	90	97
18	99	100

THE DISTILLATE COMES OVER WATER WHITE.

[signature]
6/3/09

EPAHO113000990

6/10/09 EXTRACTIONS - NAP ACID BRINE

I WILL DO 3 CONSECUTIVE EXTRACTIONS IN A SEP FUNNEL USING THE SAME SOLVENT; 10:1 DIESEL : MIBK, CHANGING OUT WITH FRESH BRINE. USE 110 mL OF BRINE EACH TIME; AS THE SOLVENT WAS PREPARED 100 mL DIESEL + 10 mL MIBK. RUN PHENOLS ON THE BRINE TO SEE HOW IT CHANGES. ONCE SPENT, CLEAN UP WITH 10% NaOH, AND REPEAT.

	PHENOLS
1ST EXTRACTION	250-300 ppm
2ND EXTRACTION	400-450 ppm
3RD EXTRACTION	~ 600 ppm

AT THIS POINT THE SOLVENT IS EXTRACTED WITH ~10% NaOH TO CLEAN IT UP. THE CAUSTIC PHASE SEPARATES PRETTY QUICKLY BUT THERE IS A VERY SMALL RAG EMULSION LAYER LEFT. IT IS ONLY SEEN WHEN THEN SEP FUNNEL IS DRAINED DOWN. THE CAUSTIC HAS A MIBK ODOR. NEED TO CHECK FLASH POINT.

6/11/09 FLASH POINT -

UNFORTUNATELY, THE FP ON WATER THAT SAT OVERNIGHT IN SEP FUNNEL IS ~ 130 F.
I'M GOING TO HAVE TO FIND ANOTHER SOLVENT COMBINATION TO DO THE EXTRACTION - WITHOUT THE FLASH POINT.
THE SOLVENT MIXTURES BELOW WILL BE MIXED ON A 1:1 BASIS WITH THE NAP ACID BRINE.

SOLVENT	FP	PHENOLS
DIESEL - 9; TOLUENE 0.5 MIBK 0.5	~135	~400
DIESEL - 1 TETRACHLOROETHYLENE 1	—	~1200
DIESEL - 2 CONSECUTIVE EXTRACTIONS	—	~1000 → ~500
3[RD] EXTRACTION - CONTINUATION OF ABOVE	—	~<400
DIESEL - 10 MIBK - 0.1		
3 CONSECUTIVE EXTRACTIONS	>140F	800 → 400 → 200

EPAHO113000992

6/15/09 NEW EXTRACTION SOLVENT TESTING

THE SEARCH FOR A NEW EXTRACTION SOLVENT THAT WILL REMOVE PHENOLS YET NOT BE SO SOLUBLE THAT IT ADDS A FLASH TO THE BRINE, CONTINUES.

DIACETONE ALCOHOL AND K-SOLV-HAN, A HEAVY AROMATIC SOLVENT NAPHTHA, WILL BE TESTED.

SOLVENT		SOLVENT: BRINE	PHENOLS
K-SOLV-HAN-100%		1:1	~ 700
DIACETONE ALCOHOL		- ~ 50% SOLUBLE IN BRINE -	RULED OUT
HAN-1	DIESEL-1	1:1	~ 700
HAN-10	MIBK-0.5	1:1	~ 300
HAN-11	MIBK-0.5	1:1	~ 200
HAN 12	MIBK 0.5	1:1	~ 300
HAN-11	MIBK-0.5	1:1	~ 250 · <3
HAN-11	MIBK 0.5	1:2	~ 400

EPAHO113000993

6/15/09 FLASH POINT - EXTRACTED BRINE

A SOLVENT BLEND OF HAN-11 - MIBK - 0.5 WAS USED ON A LARGER SCALE EXTRACTION IN ORDER TO CHECK THE FLASH POINT.
THERE IS A FP ~ 120 F.
NEXT STEP IS TO TRY DIBK - DI-ISO-BUTYL KETONE.
OLIVER BARR w/ K-SOLV WILL GET ME A SAMPLE.

6/17/09

SOLVENT	SOLVENT : BRINE	PHENOLS
DIBK	1:1	< 50
HAN-12 - DIBK - 0.5	1:1	~ 350
HAN-12 DIBK - 0.5	1:2.5	~ 500-600
HAN-10 DIBK - 0.5	1:2.5	~ 500-600
HAN-10 DIBK 1.0	1:2.5	~ 400
HAN-10 DIBK 1.0	1:1	~ 200
[HAN-10 - DIBK - 0.5] - 5 - MIBK 0.1	1:2.5	~ 500

FROM THE ABOVE, I WILL DO A LARGER SCALE EXTRACTION USING HAN-10 - DIBK-1 1:1 W/ BRINE AND CHECK PHENOLS + FLASH POINT.
PHENOLS ~ 200 + TO MAYBE 250.
FLASH POINT > 180° F.

6/17 MULTIPLE XTRACTIONS - SPENDING

USING THE HAN-10 DIBK-1 MIX, I WILL PERFORM EXTRACTIONS TO SEE PERFORMANCE DEGRADATION. I WILL DO A 1:1 EXTRACTION USING FRESH BRINE WITH THE SAME SOLVENT.

	PHENOLS
1ST EXTRACTION	~ 200+ ppm
2ND EXTRACTION	~ 400 ppm
3RD EXTRACTION	~ 600 ppm

REGENERATION w/ ~10% NaOH ON A 1:1 BASIS

A SMALL RAG IS FORMED, BUT TAKE IT INTO

6/18 THE CAUSTIC

1ST EXTRACTION	~ 200+ ppm
2ND EXTRACTION	~ 400 ppm
3RD EXTRACTION	~ 600 ppm

AT THE END OF THIS SERIES I HAVE 78 mL OF MY INITIAL 80 mL OF SOLVENT.

I WILL NEED TO DETERMINE HOW MANY TIMES I CAN USE THE SAME CAUSTIC BEFORE CHANGING IT OUT. AN APPROACH IS TO SPIKE IN CA ~~TO~~ INTO THE SOLVENT AT THE ~[2800 + 2600 + 2400 = 7800] LEVEL, WHICH MIMICS 3 EXTRACTIONS, THEN EXTRACT WITH CAUSTIC

6/18 CAUSTIC SPENTNESS LEVELS

THAT HAS BEEN SPIKED WITH INCREASING AMOUNTS OF CA, UNTIL THE FRESH BRINE SX. DOES NOT DROP BELOW ~400 ppm.

I WILL PREPARE A BATCH OF SOLVENT WITH ~ 1%, OR 10,000 ppm CA, THEN ADD IN INCREASING INCREMENTS OF ~ 3000 ppm CA TO CAUSTIC TO SEE WHERE THE CHANGEOUT IS NEEDED.

6/22 A 110 mL MIX - 10-HAN 1-DIEK - IS MADE UP. TO THIS IS ADDED 1.1 g FRA. - ACTUAL 1.118 g FRA

A NEW BATCH OF BRINE IS MADE BY SPARGING OUT SXS. OF CITGO NAP CAUSTIC. PHENOLS ARE ~ 2500 ppm.

SMALL BATCHES OF 10% NaOH WILL BE SPIKED IN ~ 3000 ppm INCREMENTS AND USED FOR THE STUDY. THESE WILL BE USED TO WASH THE SOLVENT WHICH WILL THEN BE CHECK TO SEE HOW WELL IT REDUCES CA IN FRESH BRINE SX.

EPAHO113000996

6/22 Caustic Change Out Study

(40 mL) 10% NaOH	Wt. CA.	NaOH : Solvent	Solvent : Brine	(ppm) Phenols
#1	0.027			
2	0.057			
3	0.100			
4	0.126	1:1	1:1	~250
5	0.231			
6	0.520	1:1	1:1	~250
7	1.019	1:1	1:1	~250
	NOTED ON #7 THAT IT TOOK NOTICEABLY LONGER FOR THE NaOH : SOLVENT EXTRACTION TO PHASE OUT.			
8	2.028	1:1	1:1	~250 < 300

PHASE SEPARATIONS OKAY ON ALL EXTRACTIONS
THIS IS ESSENTIALLY A 20% WC VALUE.
I'M STOPPING AT THIS POINT, AS IT'S GOOD CRESY.

6/23 HAN-DIBK SOLVENT RATIOS

I WILL CHANGE THE HAN-DIBK SOLVENT MIX TO HAN-10 DIBK-2 AND SEE HOW QUICKLY IT SPENDS OUT. THIS MIX WILL EXTRACT ON A 1:1 BASIS WITH BRINE HAVING A CA OF ~2500 ppm

	PHENOLS	
1ST EXTRACTION	~150	(<200)
2ND EXT.	~350	
3RD EXT	~500	

THE ABOVE IS JUST SLIGHTLY BETTER THAN A HAN-10 DIBK 1 MIX. IT WILL STILL ONLY ALLOW US 2 RUNS BETWEEN SOLVENT REGENERATIONS.

6/24 ONE MORE TIME USING MIBK
HAN-10 DIBK-1 MIBK-0.2

	PHENOLS
1ST EXT	<200
2ND EXT	<300

FLASH PT. ON 1ST EXTRACTION H_2O <120 F

7/13/09 0709-32 – NALCO – JOE CAMP

	pH	TREAT	PHENOLS	FP	Ni	Zn	Cu	Cd	Cr	TOC
1	3.5	NO	0	>140	2.938	0.074	.045	.006	4.029	41,830
2	9	NO	—			WON'T ASPIRATE		—	—	432,100
3	5	YES	0	>140	0.00	.027	.049	0.00	0.00	7279
4	10	NO			0.247	.601	0.154	0.00	0.027	—

	D	H_2O	BLACK OIL	TOLUENE	BTU	CHLOR-D-TECT
5	1.036	4.79	YES	YES	11024	1500

1 = 0-5% FORMALDEHYDE
2 = 0-5% MIXED CHEMICALS
3 = 100% BIOLOGICALLY TREATED WASTE WATER
4 = 0-5% OXY CONDENSATE
5 = 80-100% MIXED CHEMICALS

NOTES
1 - DOES NOT TREAT, LIME DOES NOT REACT, NO FLOC
2 - HIGH VOL. OF ACID TO LOWER pH; SMOKE GIVEN OFF ~ pH 3 - FORMS SLUDGE W/ LIME
4 - FOAMS WHEN SHAKEN LIKE IT'S FULL OF SOAP. LIME TURNS TO SLUDGE, H_2O DOES NOT TREAT, SMELL LIKE PAINT THINNER. NON-AQUEOUS!!!

LAB
T-48
8/4/09
CE

2009 MEMOS

LAB
T-48
8/4/09
CE

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman, Jay Matlock

Date: 6/25/09

Cc: Greg Bowman, Prabhaker, Jose Acosta, Steve Stricker,
Clint Hopkins, Sam Brown, Bo Cumberland

From: Miles Root

Lab Memo: 09-125

Subject: **PACES Nap Acid Brine Solvent Extraction Process**

A solvent extraction and regeneration process has been developed to deal with the hazardous waste water produced from the production of naphthenic acids at PACES, while minimizing the use of bleach. This system consists of using a mixture of HAN (heavy aromatic naphtha) and DIBK (diisobutyl ketone) to extract the phenolic compounds from the brine and changing it from hazardous waste water to non hazardous. The solvent is regenerated using a 10% caustic solution which, when spent, becomes a great feedstock for the production of cresylic acids.

Overview of Solvent Extraction and Regeneration Process

The nap acid brine is extracted on a 1:1 basis with a solvent consisting of 10 parts HAN (heavy aromatic naphtha) and 1 part DIBK (diisobutyl ketone), initially in 5000 gallons batches. (5500 gallons brine, 5500 gallons solvent). After two separate extraction runs, the solvent will be regenerated on a 1:1 basis with 10% sodium hydroxide. The caustic may be re used numerous times until the wet crude value exceeds 20%, if desired. The resulting waste water brine will have a flash point greater than 140 deg F with total cresols less than 200 ppm, making it non hazardous waste water. The mixing system will use an in-line static mixer, essentially mixing two separate streams together in a specially designed pipe to thoroughly mix two separate streams.

Overview of Naphthenic Acids

Our naphthenic acid comes from the caustic washing of kerosene, which is performed to remove the highly corrosive naphthenic acids. We receive the spent caustic from this caustic washing process. Cresylic acids also present are removed along with the nap acids during this same caustic wash. Cresylic acids boil in a temperature range which allows them to be distilled in both gasoline and kerosene production. Phenol, the lowest boiling cresylic acid, boils around 182 deg C. The cresols, those compounds which cause our waste water to be classified as hazardous, boil at 191 deg C for ortho and 202 deg C for para and meta cresol. Since the gasoline and kerosene boiling ranges overlap and change during the winter to summer production months, cresylic acids are typically present in kerosene, especially if the cresylics are not removed from the gasoline cut with an efficient caustic wash. The gasoline cut is typically in the 40-205 deg C range while the kerosene cut range is 175-325 deg C.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

When naphthenic caustic is acidified or sprung out to produce nap acid, phenolic compounds, which are weak acids, are also released or sprung out into the product. Depending upon the strength of the brine, the phenolic compounds migrate into the aqueous brine layer due to their solubility. The solubility of each of the separate cresylic isomers causes these compounds to distribute themselves in a fairly consistent isomer distribution in the brine that is produced. The strength of the brine helps to determine the actual concentration of the total cresylics present. Naphthenic caustics are typically weak caustic streams, allowing for fairly high concentrations of cresylics to be present in the brine that is produced from the springing step. Our nap acid brine typically contains from 2500 – 3000 ppm total phenolics.

Total cresols greater than 200 ppm in our waste water cause it to be classified as hazardous waste. Our current methodology of adding bleach to the water to reduce the phenolics is expensive and the bleach must be repurchased for each use. The goal of my work is to develop a system to eliminate the hazardous waste classification of our waste water while using a technology that is more cost effective than the continual use of bleach.

Cresylic Acids in Nap Acids Overview

Samples of our naphthenic caustic were obtained from PACES for testing. Aliquots were acidified to spring out the nap acids and allowed to sit. This sitting time allows any entrained nap acids to come out of the brine solution, and will be a critical step in our processing. It is similar to letting the sprung nap acid sit to give the water time to phase separate. Not allowing the brine sufficient time to sit will mean extra organics will be extracted into the solvent, needlessly tying up the solvent with nap acids instead of cresylics, and spending the solvent quicker.

Cresylic isomer analysis to determine specific concentrations of cresols requires the use of gas chromatography and/or gas chromatography-mass spec (GCMS). CES does not have the technology to analyze for cresylic acid isomers and this specialty type of testing is not readily done by outside laboratories. Merisol, my former employer, has the technology to do such testing properly, as their business is cresylic acids.

The nap acid, brine and solvent extracted brine were all analyzed by GC for cresylic acids by a former co-worker in order to determine the types of cresylic acids present. On a sample of the Total nap acid it was determined that the cresols make up 49% of the cresylics in the brine, 43% of the cresylics in the solvent extracted brine and 46% in the nap acid. While these exact values will vary from batch to batch, our total cresols can be expected to range from 40 – 50% of the total cresylics present. The para cresol component was found to be 13.7% of the total cresylics in the extracted brine sample.

This data allows us to test for total phenolics and assume as a worst case scenario that the total cresols will not be greater than 50% of our colorimetric test method results. Since we use a colorimetric field test, it is advised that we use a more refined method of quantifying the phenolics at PACES. A Spec 20 is such an instrument and total cost for setting this up will run around $2000, including the necessary reagents.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Solvent Extraction Overview

Solvent extraction is an old and well tested technology used in the chemical business for removing impurities. When done properly it is straight forward and simple in operation. The major challenges are the determination of the exact solvent(s) to be used and the elimination of any special restrictions that will be required. For PACES, the final water must have a flash point greater than 140 deg F and total cresols of less than 200 ppm.

The understanding of chemical principles, literature research and just trial and error have all helped to best fit certain types of chemicals for particular solvent extraction applications over the years. My experience and research indicate that ketones are a vital part of extractions involving phenols. All of the lower and common ketones are water soluble to some degree and have low flash points. A co-solvent was needed to attempt to reduce these shortcomings. Diesel was tested first as a co-solvent, since it is readily available and overlaps the cresylic boiling range. Diesel by itself reduced phenolics from 3000 ppm to 1000 ppm with a single 1:1 extraction. MEK (methyl ethyl ketone) was the first ketone tested since it is readily available commercially and was available on site. Its drawbacks are low flash point and high solubility in water. Diesel was used in conjunction with MEK in an attempt to possibly reduce its flash point. A 1:1 mix of diesel and MEK reduced phenolics to less than 200 ppm. As expected, the flash point on the resulting water was well below 140 deg F. Numerous changes in solvent ratios of diesel and MEK to increase the flash point were unsuccessful, as the solubility of MEK in water is too high for practical use.

A variety of other common solvents were tested, all having their shortcomings and ruled out. These included methylene chloride, toluene, hexane, diacetone alcohol and even rock salt to change the brine strength.

MIBK (methyl isobutyl ketone) was the next ketone tested. It extracted the phenolics as well as MEK but its drawback is its solubility in water as well, even though it is quite low. A variety of MIBK to diesel ratios were tested, but the highest flash point obtainable was 130 deg F.

My search for better solvents to use with the ketones resulted in the use of HAN (heavy aromatic naphtha) instead of the diesel. In addition to better pricing, the aromatic nature of this solvent allows it to extract the cresylics from 3000 ppm down to the 700 ppm level in a 1:1 extraction ratio, even better than diesel. It is also a readily available chemical.

DIBK (diisobutyl ketone) was the next ketone to be tested. DIBK works essentially as well as the more water soluble ketones yet is essentially non water soluble. Its flash point is 120 deg F, much higher than either MEK or MIBK. It is also totally miscible with HAN. Unfortunately, DIBK is a much costlier solvent due to its production costs, but a one-time purchase is still more cost effective than throwing bleach away after every use. The DIBK is such a strong solvent for phenolics that a 1:1 extraction reduces the 3000 ppm phenolics to less than 50 ppm. It is too pricey to use as a single solvent, however, and needs to be blended with the HAN.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Numerous ratios of HAN and DIBK were tested to determine the optimum use of both solvents. A ratio of 10 parts HAN to just 1 part DIBK was determined to be the most cost effective mixture. Phenolics could be reduced from 3000 ppm to less than 200 ppm with one extraction, and less than 400 ppm on a second extraction. Flash point testing on the extracted brine showed it to be greater than 180 deg F.

The best scenario for our extraction at PACES is to use a solvent mixture of 10 parts HAN with 1 part DIBK. For a trial run at PACES I suggest 5000 gallons HAN and 500 gallons DIBK. This will be used to extract two consecutive loads of 5500 gallons nap acid brine, in other words, we will be using a 1:1 extraction ratio.

After two extractions the solvent will need to be regenerated. The total phenolics will rise above the 400 ppm level, which will allow higher levels of cresols to be present.

Solvent Regeneration Overview

The solvent is regenerated using a 10% solution of sodium hydroxide. The exact concentration does not need to be exactly 10.0%, but should be around 10%. A higher concentration may allow emulsions to form which would take longer to phase separate and will tend to entrain the solvent. The principal concept is that the phenolics are once again brought back into the aqueous phase once they are converted into salts by the use of the caustic. This is the same principal being used to initially extract the phenolics/nap acids from the kerosene.

My work shows that a 10% caustic solution is still effective in reducing the phenolics in the solvent even though it may build up over 20% by volume wet crude acid from repeated use. Considering that after two uses of the solvent it will contain less than 6000 ppm phenolics, this equates to over 30 uses of the same caustic before it potentially becomes spent. Once spent, this caustic will be a good feedstock for cresylic acid production.

The solvent may be regenerated indefinitely. Once purchased, it will be spent after two extractions, regenerated with 10% caustic, and then used again. Allowing the phase separation to be complete to insure that no solvent is lost into the caustic is a critical step. This mixture separates out in the lab within one minute, but a large tank will take longer. Initial testing should include sampling of the caustic phase at timed intervals and then centrifuging testing to insure that it contains no solvent.

Cost Overview

Contact with Oliver Barr at K-Solv has resulted in a price quote of \$1.80/gallon for the HAN. This is readily available and kept in stock. The DIBK is a spot purchase specialty chemical. Current pricing is \$1.55/lb, with a weight of 6.73 lb/gal, or \$10.43/gal. We will be using initially 5000 gallons of HAN and 500 gallons of DIBK. This equates to \$9000 for the HAN and almost \$5216 for the DIBK. We will also need 10% caustic made up occasionally. I do not have spot pricing on caustic, but assuming \$500/dry ton, equates to \$1150 for a 5000 gallon trailer. Total costs are around \$15,366.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

We currently pay $1.04/gal for bleach delivered to PACES. Bleach treatment of 20% by volume is required to reduce phenolics to the same approximate 300 ppm level in the brine. Total gallons of bleach to equate to $15,366 are 14,775, which will treat 73,875 gallons of brine. This is a rough estimate, but workable. After approximately 75,000 gallons of brine are treated with bleach, we are past the break-even point for this solvent extraction system.

Concerns

There are several areas of concern that will again be addressed with this processing. Starting up a new process will always bring new challenges due to unfamiliarity to the system. The good thing is that solvent extraction systems can be easy to operate and give good performance if some basic rules are followed. The following are a few critical check points that come to mind with this system, as with most of this type.

1. The nap acid must be allowed to phase separate out to reduce levels of nap acid and phenols that the brine contains, once it is sprung out. Carry-over of nap acids into the brine will spend the solvent after one use. This will require solvent regeneration after each extraction. While this does not really cost us much in money, it will add time to our processing. If we produce brine with greater than 3000 ppm phenolics we may only obtain one extraction before solvent regeneration is necessary. If phenolics are high, we can always perform the standard two extractions and add trichlor to the final extracted brine, like we would bleach.
2. The mixing steps at each point are critical. Extractions are based upon contact of molecules. We need good mixing for adequate time that will allow the extraction of the brine and then extraction of the solvent to perform properly. The 1:1 solvent to brine ratios are designed to reduce the phenolics to the levels as indicated in this report. Other mixture ratios will alter the efficiency of the system. Too much brine will reduce the extraction steps from two to just one. The system will still work, but will involve more time for solvent regeneration, as addressed above.
3. We must allow time for the extraction mixtures of 10% caustic and solvent to phase separate. We cannot afford to lose solvent into the caustic or even brine (as mentioned above) by not allowing the tank to phase out completely. If we are careful with this process, we can use the same solvents almost indefinitely, as the components are essentially non water soluble. In the laboratory this separation takes less than one minute, but it will take longer in a process unit. With some simple testing the time necessary for the phase separation may be determined.
4. We must watch the interface between the two mixtures when they are pumped off. We cannot afford to lose solvent out of the system with each extraction. We must have in place a way to insure that this will not happen.
5. We need to have a better method in place to quantitate the phenolics by the colorimetric method. Our current visual method of distinguishing between colors can be difficult, especially if the color of your sample is not the same hue as the standard. A Spec 20 can "read" the sample a produce a number value, but its cost is around $2000, including necessary reagents. It takes a day or two to set up the standardization and all reagents, but once set up it is ready to go at anytime. Dilutions in the lab will need to be made to quantitate the 200-400 ppm phenolics, and there will be a large difference in a 300 vs. 400 ppm. We must watch and be careful with our laboratory techniques.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

6. We must not contaminate our extraction solvent with any other organics. The extraction efficiency is based upon HAN and DIBK and no other solvents. The ratios of solvent to brine are based upon our current nap acid brine produced. These ratios are not applicable to running phenolic caustic brine or any other brine or waste water.

Summary

An efficient solvent extraction system will allow PACES to produce a waste water stream that is non-hazardous. It will eliminate our current practice of the one-time use of bleach and save money in the long run. When properly set up it should run with minimal issues and produce brine solutions that can be moved to System 1 without issues. Combined with the uses of trichlor this type of brine water could potentially be processed at CES.

Solvent Summary		
	HAN	DIBK
Density	0.996	0.807
Flash Point, deg F	typically 150 - 219	120
solubility in water	negligible	0.04%
CAS Number	64742-94-5	108-83-8%
ratio for 1:1 solvent extraction	10 parts	1 part

Cresylic Acid Isomer Distribution Summary for Total			
	Nap Acid Brine Neat Sample	Nap Acid	Extracted Brine
Phenol	14.9	5.7	32.4
o-Cresol	21.1	19.7	11.7
2,6-xylenol	1.2	1.9	
m-Cresol	17.6	15.8	17.7
p-Cresol	10.7	10.7	13.7
OEP	1.6	2.0	2.8
2,4-xylenol	5.0	8.1	2.7
2,5-xylenol	3.5	5.6	1.9
PEP	2.5	3.8	7.8
2,3-xylenol	1.3	2.5	2.6
MEP	8.5	9.0	1.8
3,4-xylenol	5.8	4.7	2.2
3,5-xylenol	6.5	10.7	2.7
Total Cresols	49.4	46.1	43.2
Totals	100.0	100.0	100.0

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 7/28/09

From: Miles Root

Lab Memo: 09-141

Subject: **TSI Evaluation 0709-43**

A sample of sludge from TSI has been tested for potential marketing by CES. This sample is evaluation 0709-43 and is an unknown quantity of sludge. This sample is partially soluble in water, acetone or toluene. It does not have any free water. It is not a candidate for successful blending with black oil. It is a thick paste like material, almost black in appearance. It has a fairly strong odor, but it is not hydrocarbon in nature. A BTU on the neat sample shows only 4498 BTU/lb. This material does not flash below 140 deg F. I have no other information on this material and no additional testing was requested.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman, Sarai Melichar, Jennifer Rust
Cc: Prabhaker, Clint Hopkins, Sam Brown

Date: 7/24/09

From: Miles Root

Lab Memo: 09-140

Subject: **Tubalcain Evaluations 0709-44 & 45**

Two samples from Tubalcain have been evaluated for potential marketing/processing by CES. Evaluation 0709-44 represents approximately 30,000 gallons of lube oil to be received on an occasional basis. Evaluation 0709-45 represents material from the clean out of barge bottoms material. Overall, the oil looks good with the exception of fine brown sediments which need to be removed. The metal solids in the barge bottoms will not allow its usage with our black oil, but the material may be cleaned out using oil or solvents and disposed of.

Evaluation 0709-44 is called lube oil. This oil is slightly turbid in appearance with a pale brown hue. Its appearance is just not quite as clear as new motor oil would be. It has a density of 0.860 which is an API gravity of 33. The color is less than 0.5 and water content is 12 ppm by Hydro Scout. There are fine brown particulates which have settled out to the bottom of the sample jar. They are not numerous and I consider them as only trace quantity but are present and noted. The oil has a typical "oil" odor and the chlor-d-tect is considerably less than 1000 ppm. Other than the particulates this looks like good lube oil.

The barge bottoms material looks, smells and has an odor like roofing tar. This material is soluble in our black oil and toluene. The sample is loaded with bits and pieces of metal, most likely from a storage tank. I cleaned off a piece of this metal and it is attracted to a magnet, so it contains iron. An ash determination of the solids shows 61.6% as ash. This value is actually on the low side, as I solvent washed the solids as best I could in the time frame I had, but I feel that there were still entrained organics present which burned off these solids that lowered the final value. This is just an observation from the nature of this ash test. Also, the resultant ash from this determination is rust brown in appearance so it is almost definitely bits and pieces of a tank that are mixed in with this tar, as this is rust.

The tar can be removed with hot oil, solvents such as toluene or diesel or even HAN if we are looking to just clean out this material. The hotter the solvent the better and quicker this tar will mix. The extensive amount of chunks, bits and pieces of the tank present will not allow this material to be effectively recovered and sold with our black oil. Geocycle may be willing to burn this material for a price with these metal impurities, and contacting them is recommend if we have no other outlets and wish to pursue this work.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

The table below summarizes the analytical testing of the lube oil sample.

Tubalcain	
Evaluation 0709-44	
Appearance	Pale brown, turbid
Particulates, vol%	trace
Odor	typical oil odor
API gravity	33
Water, ppm	12
Chlor-d-tect, ppm	<<1000
Black Oil Blendability	Okay

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 7/15/09

From: Miles Root

Lab Memo: 09-139

Subject: **Polytex Fibers Evaluation 0709-34**

A sample of black oil from Polytex Fibers, Baythorne Dr., has been evaluated for potential use in our black oil for sales at CES. This sample is evaluation 0709-34 and represents a potential of 9-10 drums of material annually. Overall, this oil looks acceptable for blending with our black oil and its acquisition is recommended.

This oil is black in appearance and contains only a trace amount of particulates that can be centrifuged out. It has a typical oil odor, an API gravity of 28, no water, and blends just fine with our typical black oil. The chlor-d-tect is an acceptable 700 ppm. This oil is recommended for acquisition and it may be blended and sold with our other black oil without issues.

The table below summarizes the analytical testing.

Polytex Fibers	
Evaluation 0709-34	
Appearance	black
Solids, vol%	trace
Odor	typical oil odor
API gravity	28
Water, %	0
Chlor-d-tect, ppm	700
Black Oil Blendability	Okay

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 7/14/09

From: Miles Root

Lab Memo: 09-138

Subject: **<u>TT Barge Mile 183 Evaluation 0709-33</u>**

A sample of sodium aluminate in sodium hydroxide from TT Barge Mile 183 has been evaluated for potential use at CES. This sample is evaluation 0709-33. The potential volume of this stream is unknown at this time. Overall, this chemical may be used as a substitute for lime in our standard water treatment.

Sodium aluminate can be used in water treatment as a coagulant to improve flocculation. This sample comes from a barge washing operation with the sodium hydroxide content to be ranging from 10-50% and with the sodium aluminate ranging from 0.5 to 15%.

A sample of our process water with a zinc concentration of around 100 ppm was treated by our standard water treatment and also a second time using this sample in place of the lime. In each case I was very careful to adjust the final pH to 10.5 for maximum removal of the zinc. The standard treat reduced zinc to 3.5 ppm while the sodium aluminate reduced it to 4 ppm. This is a very close agreement between the two and within experimental variances.

To use this product, the standard water treatment is performed with the ferric and sulfuric addition; this is followed with pH adjustment with the sodium aluminate to 10.5, followed by polymer. Lime is not used. The main issue with this material will be its inconsistency. We can use this as a product if we adjust based upon pH. With a given range of 10-50% caustic there could easily be a large variation in usage volume. Also, the color of this caustic is brown, which just sodium aluminate and caustic is not. There are other components in this mixture unknown at this time giving it this appearance. This may not even matter, and it does not affect its usefulness, but it's just an observation.

The unknown side is that sodium aluminate may not work equally well in all types of metal streams that we may encounter. Since both of these products are in use, there must be a reason; otherwise one would clearly dominate in the water treatment business. My conclusions are based upon one sample data point, and not dozens or hundreds.

We can use this as a substitute for lime but it will take some adjustment. Also, we should expect each batch that we receive to be different. The obvious benefits are cost reduction in chemicals used for water treatment. The downside is varying treat times based upon the caustic strength. If we decide to try this out, we should do it on a trial basis to see its ease of use. We will also need a separate storage vessel for this material, with our lines hooked up to the current lime usage system.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Camp
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 7/14/09

From: Miles Root

Lab Memo: 09-137

Subject: **Nalco Evaluations 0709-32**

Five samples of waste water and waste chemicals from Nalco, Freeport, have been evaluated for potential processing at CES. These five samples are evaluation 0709-32, numbers one thru five. The potential volume of these streams will vary and range from weekly tote to 10,000 gallons loads. Overall, the one sample labeled as mixed chemicals may be mixed with black oil. Two of the aqueous streams are potentially acceptable for processing while a third will need sludge box disposal.

The two MSDS sheets sent with this material don't really appear to be related to these samples. The first is potassium hydroxide. The second is a solvent consisting of HAN, naphthalene and some tri methyl benzene. Possibly Nalco uses these chemicals somewhere in their processing, but these chemicals are not really in these samples. These are supposed to be four water streams and one chemical stream, but that is not really an accurate description.

The first waste water is said to contain up to 5% formaldehyde, but this sample does not have an odor of formaldehyde. Formaldehyde is a U listed waste, which is regulated at a threshold of 100 kg/month. This sample does not treat. Its pH is 3.5 and the addition of any ferric followed by lime does not form any floc. It is easy to see that the lime does nothing but fall to the bottom of the beaker when added. A sample of the waste was run neat to determine its impurities. The sample does have a rather strong odor of a hydrocarbon, but not formaldehyde, so a flash point was run. A flash point on the neat water is greater than 140 deg F. There are no phenols but this waste is a little high in both nickel and chromium. The TOC is 41,830. The only option we have with this waste is to equalize it out with "good" and without treatment. Since I do not know the volume of material we are dealing with, I cannot make any recommendation on this stream. If we had unlimited "good" water we could handle any volume, but this is not the case. Joe, we will need potential volumes for this particular stream to help Clint determine how much of this water we can potentially move this water through our plant using equalization.

The second waste is said to contain up to 5% of mixed chemicals. I do not know what the chemicals are, only that this is supposed to be a non hazardous stream. This material is rather thick and I would be surprised if it only contained 5% of any chemicals. This material does not treat and will not aspirate into the flame AA even when run neat, due to its viscosity. It has a pH of 9. A TOC on the neat sample is 432,100 ppm. I'm not even sure this is really waste water. We can always dispose of this material in a sludge box if we desire and I have no information indicating we cannot do this. Joe, determine for sure that this is going to be non hazardous waste water.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

The third stream is supposed to be 100% biologically treated waste water though it smells as though it contains paint thinner. The neat sample has a flash point of greater than 140 deg F. It does treat like regular water and we should have no issues in its treatment. The neat sample has a pH of 5. The treated water has no phenols, acceptable metals and TOC of 7279 ppm. We can treat any amount of this water without issues, and its acquisition is recommended.

The fourth stream is supposed to be up to 5% Oxy condensate, whatever that is. A condensate should contain condensate, or water, from processing. This sample is actually some type of light organic hydrocarbon that is essentially not water miscible. This sample cannot be correct for what it is trying to represent. Joe, you will need to revisit with Nalco on this particular sample for sure.

The fifth stream is 80-100% mixed chemicals. I do not know what the chemicals are and they are not represented on the MSDS. A chlor-d-tect on this sample shows approximately 1500 ppm but this number is suspect in my mind. This sample is not oil and the test is rather specific for oil. Also, I don't like the color of the end point; it just doesn't look quite right when running this sample. On this particular sample I wouldn't put too much faith in the chlor-d-tect. I'd like to know what these chemicals actually are. The density of this material is 1.036. It shows 4.79% water by Hydro Scout. It mixes with black oil and is soluble in toluene and acetone. It has a BTU value of 11024. We might want to look at blending this into our black oil once we know what it is we will be blending. Joe, we need to determine from Nalco what these chemicals are before putting them into our black oil.

We will need to get more specific on the potential volumes of these streams and determine what exactly it is we are supposed to be getting. The only real water stream here is the biologically treated waste water that has an odor of paint thinner. The Oxy condensate sample is just not correct and the other two supposed water streams just won't treat as water. It's not that we can't do something with them, it's just that I don't really know what these streams are and it appears as though Nalco may be somewhat confused as well. I suggest that CES revisit with Nalco to clear up these seeming inconsistencies with what these samples are to represent and then we move forward with newly gathered information to help them out as best we can.

The table below summarizes the analytical testing.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Nalco Freeport					
Evaluations 0709-32 numbers 1 thru 5					
Evaluation No.	1	2	3	4	5
Material	5% formaldehyde	5% mixed chemicals	bio water	5% Oxy Cond.	Mixed Chemicals
pH	3.5	9	5	10	N/A
Treatability	No	No	Yes	No	N/A
Phenols	0		0		N/A
Flash Point, deg F	>140		>140		N/A
TOC, ppm	41,830 (neat)	432100 (neat)	7,279		N/A
Metals	neat metals				N/A
Ni	2.938		0.000		N/A
Zn	0.034		0.027		N/A
Cu	0.045		0.049		N/A
Cd	0.006		0.000		N/A
Cr	4.029		0.000		N/A
Density					1.036
Water, %					4.79
Chlor-d-tect, ppm					1500
Black Oil Compatibility					Yes
Toluene Solubility					Yes
BTU/lb					11,024

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman, Jennifer Rust
Cc: Prabhaker, Clint Hopkins, Sam Brown

Date: 7/09/09

From: Miles Root

Lab Memo: 09-136

Subject: **Kinder Morgan Evaluations 0709-05 & 06**

Two samples of aqueous sludge from Kinder Morgan, Pasadena, have been evaluated for processing at CES. These samples are evaluations 0709-05 and 06. These samples represent two sludge boxes of material. Overall, this material has no recoverable hydrocarbons and a low flash point. We may be able to process these loads to send to a landfill if the benzene content is acceptable. .

These two samples represent two sludge boxes of material. A composite of the two samples was made for the testing. One sample has approximately 70-80% solids which looks like clay. The second sample is around 40% solids with the remaining material having a clay like consistency. A composite of these two samples has a flash point between 125 and 130 deg F. The neat sample has a pH of 10. Even though this material has an odor of hydrocarbons, the sample appears to be totally miscible with water.

The non solids portion was treated like waste water, even though it does not resemble water in any way but rather looks like mud slurry. This material foams excessively when acidified to form a layer with a meringue like consistency. I estimate the sample volume as at least doubling when acidified as a result of the foaming action. When mixed extensively by hand (my stir bar was unable to mix this) the foam eventually subsides. If allowed to sit, the foam does not appear to subside. The addition of lime forms a material with the consistency of paste. This paste does not centrifuge out any free liquid.

Basically this material is aqueous with lots of solids. We cannot treat the liquid as typical water in its treatment, as it just does not work. It also has a low flash point that must be dealt with. Our only viable option is to first run TCLP benzene on the material, since it is always suspect on this material from Kinder Morgan. If the benzene tests low we can proceed. This material can be moved into a sludge box and solidified to remove the low flash. Since the majority of these two boxes appear to be solids/sludge, this will hopefully not require an excessive amount of a material such as fly ash. Once complete, it goes out to a landfill. This is a plan that can be worked if the pricing is right, and is my recommendation.

Laboratory Analysis Report

Total Number of Pages: 15

Job ID : 09070273

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
0709-11

Report To :	Client Name:	CES Environmental	P.O.#.: 0709-11
	Attn:	Miles Root	Sample Collected By: Miles Root
	Client Address:	4904 Griggs Rd	Date Collected: 07/10/09
	City, State, Zip:	Houston, Texas, 77021	

A&B Labs has analyzed the following samples...

Client Sample ID	Matrix	A&B Sample ID
0709-11	Soil	09070273.01

Shantall Carpenter

Released By: Shantall Carpenter
Title: Project Manager
Date: 7/21/2009

This Laboratory is NELAP (T104704213-09-TX) accredited. Effective: 07/01/2009; Expires: 06/30/2010
Scope: Non-Potable Water, Drinking Water, Air, Solid, Hazardous Waste

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted in the attached exception reports. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been identified in the Laboratory Review Checklist, and that no information or data have been knowingly withheld that would affect the quality of the data.

Date Received : 07/10/2009 09:39

LABORATORY TERM AND QUALIFIER DEFINITION REPORT

Job ID : 09070273 Date: 7/21/2009

General Term Definition

Back-Wt	Back Weight	Post-Wt	Post Weight
BRL	Below Reporting Limit	ppm	parts per million
cfu	colony-forming units	Pre-Wt	Previous Weight
Conc.	Concentration	Q	Qualifier
D.F.	Dilution Factor	RegLimit	Regulatory Limit
Front-Wt	Front Weight	RPD	Relative Percent Difference
LCS	Laboratory Check Standard	RptLimit	Reporting Limit
LCSD	Laboratory Check Standard Duplicate	SDL	Sample Detection Limit
MS	Matrix Spike	surr	Surrogate
MSD	Matrix Spike Duplicate	T	Time
MW	Molecular Weight	TNTC	Too numerous to count

Qualifier Definition

LABORATORY TEST RESULTS

Job ID : 09070273

Date 7/21/2009

Client Name:	CES Environmental	Attn: Miles Root
Project Name:	0709-11	

Client Sample ID:	0709-11	Job Sample ID:	09070273.01
Date Collected:	07/10/09	Sample Matrix	Soil
Time Collected:	08:00		
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	Rpt Limit	Reg Limit	Q	Date Time	Analyst
SW-846 1010	Ignitability (Flash Point)								
	Ignitability	>150	°F	1				07/20/09 06:20	SG
SW-846 6010C	TCLP Metals								
	Arsenic	BRL	mg/L	1	0.04	5.0		07/15/09 11:07	TK
	Barium	2.910	mg/L	1	0.04	100.0		07/15/09 11:07	TK
	Cadmium	BRL	mg/L	1	0.04	1.0		07/15/09 11:07	TK
	Chromium	BRL	mg/L	1	0.04	5.0		07/15/09 11:07	TK
	Lead	BRL	mg/L	1	0.04	5.0		07/15/09 11:07	TK
	Selenium	BRL	mg/L	1	0.1	1.0		07/15/09 11:07	TK
	Silver	BRL	mg/L	1	0.04	5.0		07/15/09 11:07	TK
SW-846 7.3	Reactive Cyanide								
	Reactive Cyanide	BRL	mg/Kg	1	25			07/10/09 14:01	KS
SW-846 7.3	Reactive Sulfide								
	Reactive Sulfide	BRL	mg/Kg	1	25			07/10/09 15:15	KS
SW-846 7470A	TCLP Metals, Mercury								
	Mercury	BRL	mg/L	1	0.0005	0.2		07/14/09 15:50	SS
SW-846 8260B	TCLP VOC								
	1,1-Dichloroethylene	BRL	mg/L	1	0.13	0.6		07/14/09 14:42	HW
	1,2-Dichloroethane	BRL	mg/L	1	0.13	0.5		07/14/09 14:42	HW
	1,4-Dichlorobenzene	BRL	mg/L	1	0.15	7.5		07/14/09 14:42	HW
	Benzene	BRL	mg/L	1	0.13	0.5		07/14/09 14:42	HW
	Carbon tetrachloride	BRL	mg/L	1	0.13	0.5		07/14/09 14:42	HW
	Chlorobenzene	BRL	mg/L	1	0.15	70		07/14/09 14:42	HW
	Chloroform	BRL	mg/L	1	0.13	6		07/14/09 14:42	HW
	MEK	BRL	mg/L	1	0.13	200		07/14/09 14:42	HW
	Tetrachloroethylene	BRL	mg/L	1	0.16	0.7		07/14/09 14:42	HW
	Trichloroethylene	BRL	mg/L	1	0.13	0.5		07/14/09 14:42	HW
	Vinyl Chloride	BRL	mg/L	1	0.1	0.2		07/14/09 14:42	HW
	p-Bromofluorobenzene(surr)	90.2	%	1	70-130			07/14/09 14:42	HW
	Toluene-d8(surr)	101	%	1	70-130			07/14/09 14:42	HW
	1,2-Dichloroethane-d4(surr)	99.6	%	1	70-130			07/14/09 14:42	HW
	Dibromofluoromethane(surr)	94.4	%	1	70-130			07/14/09 14:42	HW
SW-846 8270D	TCLP Semivolatiles								
	1,4-Dichlorobenzene	BRL	mg/L	1	0.05	7.5		07/14/09 12:56	ML
	2,4,5-Trichlorophenol	BRL	mg/L	1	0.05	400		07/14/09 12:56	ML
	2,4,6-Trichlorophenol	BRL	mg/L	1	0.05	2		07/14/09 12:56	ML
	2,4-Dinitrotoluene	BRL	mg/L	1	0.05	0.13		07/14/09 12:56	ML
	2-Methylphenol	BRL	mg/L	1	0.05	200		07/14/09 12:56	ML
	3- & 4-Methylphenols	BRL	mg/L	1	0.05	200		07/14/09 12:56	ML

EPAHO113001020

LABORATORY TEST RESULTS

Job ID : 09070273

Date 7/21/2009

Client Name: CES Environmental

Attn: Miles Root

Project Name: 0709-11

Client Sample ID: 0709-11
Date Collected: 07/10/09
Time Collected: 08:00
Other Information:

Job Sample ID: 09070273.01
Sample Matrix Soil

Test Method	Parameter/Test Description	Result	Units	DF	Rpt Limit	Reg Limit	Q	Date Time	Analyst
SW-846 8270D	TCLP Semivolatiles								
	Hexachlorobenzene	BRL	mg/L	1	0.05	0.13		07/14/09 12:56	ML
	Hexachlorobutadiene	BRL	mg/L	1	0.05	0.1		07/14/09 12:56	ML
	Hexachloroethane	BRL	mg/L	1	0.05	3		07/14/09 12:56	ML
	Nitrobenzene	BRL	mg/L	1	0.05	2		07/14/09 12:56	ML
	Pentachlorophenol	BRL	mg/L	1	0.05	100		07/14/09 12:56	ML
	Pyridine	BRL	mg/L	1	0.05	4		07/14/09 12:56	ML
	2-Fluorophenol(surr)	34	%	1	20-115			07/14/09 12:56	ML
	p-Terphenyl-d14(surr)	59.6	%	1	30-140			07/14/09 12:56	ML
	2,4,6-Tribromophenol(surr)	53.9	%	1	10-120			07/14/09 12:56	ML
	2-Fluorobiphenyl(surr)	53	%	1	30-115			07/14/09 12:56	ML
	Nitrobenzene-d5(surr)	47.5	%	1	20-120			07/14/09 12:56	ML
	Phenol-d6(surr)	22.5	%	1	15-120			07/14/09 12:56	ML
SW-846 9045D	Corrosivity, pH								
	pH	8.61	s.u.					07/14/09 14:00	SG

QUALITY CONTROL CERTIFICATE

Job ID : 09070273 **Date :** 7/21/2009

Analysis : Reactive Sulfide **Method : SW-846 7.3** **Reporting Units : mg/Kg**

QC Batch ID : Qb09071311 **Created Date :** 07/10/09 **Created By :** Ksudha

Samples in This QC Batch : 09070273.01

Sample Preparation : PB09071310 **Prep Method :** SW-846 7.3 **Prep Date :** 07/10/09 14:00 **Prep By :** Ksudha

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	RptLimit		Qual
Reactive Sulfide		BRL	mg/Kg	1	25		

QC Type: Duplicate

QC Sample ID: 09060644.31

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
Reactive Sulfide	0	BRL	mg/Kg		20		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Reactive Sulfide	1000	760	76	1000	760	76	0	20	40-120	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 09070273 **Date :** 7/21/2009

Analysis : Reactive Cyanide **Method : SW-846 7.3** **Reporting Units : mg/Kg**

QC Batch ID : Qb09071313 **Created Date :** 07/10/09 **Created By :** Ksudha

Samples in This QC Batch : 09070273.01

Sample Preparation : PB09071313 **Prep Method :** SW-846 7.3 **Prep Date :** 07/10/09 14:00 **Prep By :** Ksudha

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	RptLimit		Qual
Reactive Cyanide		BRL	mg/Kg	1	25		

QC Type: Duplicate

QC Sample ID: 09060644.31

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
Reactive Cyanide	BRL	BRL	mg/Kg		20		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Reactive Cyanide	25	10.3	41.2	25	11.0	44	6.6	20	40-120	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 09070273 **Date :** 7/21/2009

Analysis : Corrosivity, pH **Method :** SW-846 9045D **Reporting Units :** s.u.

QC Batch ID : Qb09071420 **Created Date :** 07/14/09 **Created By :** Sgarcia

Samples in This QC Batch : 09070273.01

QC Type: Duplicate

QC Sample ID: 09070272.01

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
pH	6.95	6.93	s.u.	0.3	5		

QC Type: LCS and LCSD

Parameter	LCS Assigned	LCS Result		LCSD Assigned	LCSD Result		RPD	RPD CtrlLimit	Tolerance	Qual
pH	4.00	4.01							3.95-4.05	

Refer to the Definition page for terms.

EPAHO113001024

QUALITY CONTROL CERTIFICATE

Job ID : 09070273 **Date :** 7/21/2009

Analysis : TCLP VOC **Method : SW-846 8260B** **Reporting Units : mg/L**

QC Batch ID : Qb09071431 **Created Date :** 07/14/09 **Created By :** Whuimei

Samples in This QC Batch : 09070273.01

Sample Preparation :	PB09071419	**Prep Method :** SW-846 5030C	**Prep Date :** 07/14/09 10:20	**Prep By :**	Whuimei
TCLP Prep :	PB09071407	**Prep Method :** SW-846 1311	**Prep Date :** 07/13/09 17:30	**Prep By :**	Sgarcia

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	RptLimit		Qual
1,1-Dichloroethylene	75-35-4	BRL	mg/L	1	0.13		
1,2-Dichloroethane	107-06-2	BRL	mg/L	1	0.13		
1,4-Dichlorobenzene	106-46-7	BRL	mg/L	1	0.15		
Benzene	71-43-2	BRL	mg/L	1	0.13		
Carbon tetrachloride	56-23-5	BRL	mg/L	1	0.13		
Chlorobenzene	108-90-7	BRL	mg/L	1	0.15		
Chloroform	67-66-3	BRL	mg/L	1	0.13		
MEK	78-93-3	BRL	mg/L	1	0.13		
Tetrachloroethylene	127-18-4	BRL	mg/L	1	0.16		
Trichloroethylene	79-01-6	BRL	mg/L	1	0.13		
Vinyl Chloride	75-01-4	BRL	mg/L	1	0.1		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
1,1-Dichloroethylene	0.5	0.534	107	0.5	0.516	103	3.4	25	70-130	
Benzene	0.5	0.509	102	0.5	0.508	102	0.2	25	70-130	
Chlorobenzene	0.5	0.495	99	0.5	0.499	99.8	0.8	25	70-130	
MEK	0.5	0.425	85	0.5	0.47	94	10.1	35	70-180	
Tetrachloroethylene	0.5	0.499	99.8	0.5	0.513	103	2.8	25	70-130	
Trichloroethylene	0.5	0.475	95	0.5	0.483	96.6	1.7	25	70-130	

QC Type: MS and MSD
QC Sample ID: 09070268.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
1,1-Dichloroethylene	BRL	0.5	0.502	100						70-130	
Benzene	BRL	0.5	0.498	99.6						70-130	
Chlorobenzene	BRL	0.5	0.5	100						70-130	
MEK	BRL	0.5	0.438	87.6						70-130	
Trichloroethylene	BRL	0.5	0.46	92						70-130	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 09070273 **Date :** 7/21/2009

Analysis : TCLP Metals **Method : SW-846 6010C** **Reporting Units : mg/L**

QC Batch ID : Qb09071434 **Created Date :** 07/14/09 **Created By :** Tkhuc

Samples in This QC Batch : 09070273.01

Digestion :	PB09071422	**Prep Method :** SW-846 3010A	**Prep Date :**	07/14/09 11:00	**Prep By :**	Tkhuc
TCLP Prep :	PB09071407	**Prep Method :** SW-846 1311	**Prep Date :**	07/13/09 17:30	**Prep By :**	Sgarcia

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	RptLimit		Qual
Arsenic	7440-38-2	BRL	mg/L	1	0.04		
Barium	7440-39-3	BRL	mg/L	1	0.04		
Cadmium	7440-43-9	BRL	mg/L	1	0.04		
Chromium	7440-47-3	BRL	mg/L	1	0.04		
Lead	7439-92-1	BRL	mg/L	1	0.04		
Selenium	7782-49-2	BRL	mg/L	1	0.1		
Silver	7440-22-4	BRL	mg/L	1	0.04		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Arsenic	2	2.120	106	2	2.149	107	1.4	20	80-120	
Barium	2	1.902	95.1	2	1.915	95.8	0.7	20	80-120	
Cadmium	2	1.991	99.6	2	2.010	101	1	20	80-120	
Chromium	2	1.950	97.5	2	1.954	97.7	0.2	20	80-120	
Lead	2	1.771	88.6	2	1.781	89.1	0.6	20	80-120	
Selenium	2	2.112	106	2	2.151	108	1.8	20	80-120	
Silver	2	2.046	102	2	2.068	103	1.1	20	80-120	

QC Type: MS and MSD
QC Sample ID: 09070273.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Arsenic	BRL	2	2.171	109						45-138	
Barium	2.910	2	4.640	86.5						39-135	
Cadmium	BRL	2	2.051	103						56-125	
Chromium	BRL	2	1.909	95.5						52-125	
Lead	BRL	2	1.789	89.5						55-125	
Selenium	BRL	2	2.153	108						70-130	
Silver	BRL	2	2.108	105						26-148	

Refer to the Definition page for terms.

EPAHO113001026

QUALITY CONTROL CERTIFICATE

Job ID : 09070273 **Date :** 7/21/2009

Analysis : TCLP Semivolatiles **Method : SW-846 8270D** **Reporting Units : mg/L**

QC Batch ID : Qb09071435 **Created Date :** 07/14/09 **Created By :** Mli

Samples in This QC Batch : 09070273.01

Extraction :	PB09071409	**Prep Method :**	SW-846 3510C	**Prep Date :**	07/14/09 10:12	**Prep By :**	Lwang
TCLP Prep :	PB09071407	**Prep Method :**	SW-846 1311	**Prep Date :**	07/13/09 17:30	**Prep By :**	Sgarcia

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	RptLimit		Qual
1,4-Dichlorobenzene	106-46-7	BRL	mg/L	1	0.05		
2,4,5-Trichlorophenol	95-95-4	BRL	mg/L	1	0.05		
2,4,6-Trichlorophenol	88-06-2	BRL	mg/L	1	0.05		
2,4-Dinitrotoluene	121-14-2	BRL	mg/L	1	0.05		
2-Methylphenol	95-48-7	BRL	mg/L	1	0.05		
3- & 4-Methylphenols	108-39-4 & 106-44-5	BRL	mg/L	1	0.05		
Hexachlorobenzene	118-74-1	BRL	mg/L	1	0.05		
Hexachlorobutadiene	87-68-3	BRL	mg/L	1	0.05		
Hexachloroethane	67-72-1	BRL	mg/L	1	0.05		
Nitrobenzene	98-95-3	BRL	mg/L	1	0.05		
Pentachlorophenol	87-86-5	BRL	mg/L	1	1.25		
Pyridine	110-861	BRL	mg/L	1	0.05		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
1,4-Dichlorobenzene	0.25	0.167	66.8	0.25	0.171	68.4	2.4	35	24-134	
2,4,5-Trichlorophenol	0.25	0.215	86	0.25	0.204	81.6	5.2	35	6-115	
2,4,6-Trichlorophenol	0.25	0.18	72	0.25	0.186	74.4	3.3	35	40-138	
2,4-Dinitrotoluene	0.25	0.184	73.6	0.25	0.182	72.8	1.1	35	32-114	
2-Methylphenol	0.25	0.163	65.2	0.25	0.165	66	1.2	35	6-132	
3- & 4-Methylphenols	0.5	0.321	64.2	0.5	0.313	62.6	2.5	35	29-132	
Hexachlorobenzene	0.25	0.212	84.8	0.25	0.214	85.6	0.9	35	44-142	
Hexachlorobutadiene	0.25	0.18	72	0.25	0.174	69.6	3.4	35	20-124	
Hexachloroethane	0.25	0.169	67.6	0.25	0.17	68	0.6	35	14-136	
Nitrobenzene	0.25	0.202	80.8	0.25	0.197	78.8	2.5	35	38-146	
Pentachlorophenol	0.25	0.138	55.2	0.25	0.136	54.4	1.5	35	25-125	
Pyridine	0.25	0.099	39.6	0.25	0.098	39.2	1	35	6-112	

QC Type: MS and MSD
QC Sample ID: 09070317.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
1,4-Dichlorobenzene	BRL	0.25	0.125	50						24-134	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 09070273 **Date :** 7/21/2009

Analysis : TCLP Semivolatiles **Method : SW-846 8270D** **Reporting Units : mg/L**

QC Batch ID : Qb09071435 **Created Date :** 07/14/09 **Created By :** Mli

Samples in This QC Batch : 09070273.01

QC Type: MS and MSD
QC Sample ID: 09070317.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
2,4,5-Trichlorophenol	BRL	0.25	0.146	58.4						6-115	
2,4,6-Trichlorophenol	BRL	0.25	0.124	49.6						40-138	
2,4-Dinitrotoluene	BRL	0.25	0.123	49.2						32-114	
2-Methylphenol	BRL	0.25	0.113	45.2						6-132	
3- & 4-Methylphenols	BRL	0.5	0.212	42.4						29-132	
Hexachlorobenzene	BRL	0.25	0.151	60.4						44-142	
Hexachlorobutadiene	BRL	0.25	0.13	52						20-124	
Hexachloroethane	BRL	0.25	0.129	51.6						14-136	
Nitrobenzene	BRL	0.25	0.146	58.4						38-146	
Pentachlorophenol	BRL	0.25	0.131	52.4						25-125	
Pyridine	BRL	0.25	0.063	25.2						6-112	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 09070273 **Date :** 7/21/2009

Analysis :	**TCLP Metals, Mercury**	**Method :**	**SW-846 7470A**	**Reporting Units :**	**mg/L**

QC Batch ID : Qb09071448 **Created Date :** 07/14/09 **Created By :** Ssrinivasan

Samples in This QC Batch : 09070273.01

Digestion :	PB09071429	**Prep Method :**	SW-846 7470A	**Prep Date :**	07/14/09 08:00	**Prep By :**	Ssrinivasan
TCLP Prep :	PB09071407	**Prep Method :**	SW-846 1311	**Prep Date :**	07/13/09 17:30	**Prep By :**	Sgarcia

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	RptLimit		Qual
Mercury	7439-97-6	BRL	mg/L	1	0.0005		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Mercury	0.005	0.0050	101	0.005	0.0050	100	0.4	35	71-143	

QC Type: MS and MSD
QC Sample ID: 09070237.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Mercury	BRL	0.005	0.0051	101						61-175	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 09070273 **Date :** 7/21/2009

Analysis : Ignitability (Flash Point) **Method : SW-846 1010** **Reporting Units : °F**

QC Batch ID : Qb09072022 **Created Date :** 07/20/09 **Created By :** Sgarcia

Samples in This QC Batch : 09070273.01

QC Type: Duplicate

QC Sample ID: 09070207.01

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
Ignitability	>150	>150	°F		20		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Ignitability	83	85	102	83	86	104	1.2	20	75-125	

Refer to the Definition page for terms.

EPAHO113001030

CES Environmental Services, Inc.

TESTING LABORATORY IDENTIFICATION & INFORMATION:
A+B LABS
10100 EAST FWY SUITE 100
713-453-6060

09070273

CHAIN of CUSTODY RECORD

CES Environmental Services, Inc.
4904 Griggs Road
Houston, TX 77021
Main Number: (713) 676-1460
Fax Number: (713) 676-1676

Test Results Reporting
CES Environmental Services, Inc.
Main Number: (713) 676-1460
Fax Number: (713) 676-1676

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Project Name	Sample Name	Comments/Special Instructions:
	0709-11	**Turnaround Time Required:**
Contact: MILES ROOT 832-607-6678		DATE and/or Number of Days: STANDARD
SAMPLER: PRINT: MILES ROOT SIGN: [signature]		**OTHER INFORMATION:** SAMPLE TAKEN 7/10/09 - 8AM.
Type and Number of Containers (CIRCLE): Glass 1 2 3 / Grab 4 5 6 Other:		SAMPLE NAME/ID ('s): 0709-11 (DIH) / **CES Sample LOG BK Number ('s):** 0709-11

Requested Analysis: TCLP METALS, TCLP VOLATILES + SEMI VOLATILES, RCI ☐ ☐

Relinquished By	Date	Time	Received By	Date	Time
1. Relinquished By: [signature]	7/10/09	9:20	2. Received By: [signature]	7/10/09	9:20 AM
3. Relinquished By: [signature]	7/10/09	9:39	4. Received By: [signature]	7/10/09	9:39 AM
5. Relinquished By:	Date:	Time:	6. Received By:	Date:	Time:

EPAHO11300103 1

Sample Condition Checklist

Date : **07/21/09**

A&B JobID :	**09070273**	Date Received :	**07/10/2009**	Time Received :	**9:39AM**
Client Name :	**CES Environmental**				
Temperature :	**19.3°C**	Sample pH :	**N/A**		

	Check Points	Yes	No
1.	Cooler seal present and signed.	N/A	
2.	Sample(s) in a cooler.		X
3.	If yes, ice in cooler.		X
4.	Sample(s) received with chain-of-custody.	X	
5.	C-O-C signed and dated.	X	
6.	Sample(s) received with signed sample custody seal.	N/A	
7.	Sample containers arrived intact. (If no comment).	X	
8.	Matrix : Water ☐ Soil ☑ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☐ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐		
9.	Sample(s) were received in appropriate container(s).	X	
10.	Sample(s) were received with proper preservative	N/A	
11.	All samples were logged or labeled.	X	
12.	Sample ID labels match C-O-C ID's	X	
13.	Bottle count on C-O-C matches bottles found.	X	
14.	Sample volume is sufficient for analyses requested.	X	
15.	Samples were received within the hold time.	X	
16.	VOA vials completely filled.	N/A	
17.	Sample accepted.	X	

Comments : Include actions taken to resolve discrepancies/problem:

Sample was collected and brought straight to lab.

Received by : Mgonzalez

Check in by/date : Mgonzalez / 07/10/2009

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Camp, Jennifer Rust
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 7/09/09

From: Miles Root

Lab Memo: 09-135

Subject: **Hydrocarbon Engineering Evaluation 0709-08**

A sample of waste water from Hydrocarbon Engineering has been evaluated for potential processing at CES. This sample is evaluation 0709-08 and represents an unknown volume or frequency of water. Overall, this water is on the high side for phenols, but can be treated at CES.

This sample is murky brown in appearance and has an acceptable slight hydrocarbon type odor. The pH is 7 and the water has a trace of solids. The water does not have a flash point below 140 deg F. The water treats easily and forms a nice floc that readily separates. The treated water has 15 ppm phenols, a very high TOC of 44,780 ppm and acceptable metals.

The phenols are on the high side and may need treatment if the actual water comes in with higher phenols. Pricing should include the high TOC values. We can treat this water at CES and its acquisition is recommended. The table below summarizes the analytical testing.

Hydrocarbon Engineering Evaluation 0709-08	
pH	7
Phenols, ppm	15
TOC, mg/L	44,780
Odor	Acceptable
Flash Point, deg F	>140
Oil, vol%	0
Solids	trace
Treatability	OK
Metals, ppm	
Ni	0.105
Zn	0.100
Cu	0.097
Cd	0.006
Cr	0.000

CES Environmental Services, Inc.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Camp
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 7/08/09

From: Miles Root

Lab Memo: 09-134

Subject: **Texmark Chemicals Evaluation 0709-07**

A sample of lube additive from Texmark Chemicals has been evaluated for potential oil blending suitability at CES. This sample is evaluation 0709-07 and represents one tote per month of off spec lube additive. Overall, this material appears to be suitable for blending with black oil and its acquisition is recommended.

This sample is clear amber in appearance and has a color of 3.5. It seemingly mixes with base oil but can be centrifuged out, which indicates to me that it is not suitable for that purpose. It appears to stay mixed with black oil even after been centrifuged for several minutes, numerous times. It has water content by Hydro Scout of 7277 ppm and a flash point greater than 140 deg F. The chlor-d-tect is less than 100 ppm. This material is very thick so it will need a good pump to remove it from the tote. It has a typical oil type additive odor that is not objectionable.

The analytical testing is summarized in the table below.

Texmark Chemicals	
Evaluation 0709-07	
Flash Point, deg F	>140
Appearance	amber
Color	3.5
Odor	Not Objectionable
Black oil suitability	Yes
Base oil suitability	No
Water, ppm	7,277
Chlor-d-tect, ppm	<100

CES Environmental
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4904 Griggs Road
Houston, TX 77021
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To: Joe Camp, Sarai Melichar
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 7/07/09

From: Miles Root

Lab Memo: 09-132

Subject: **Future Environmental Evaluations 0709-03 & 04**

Two samples from Future Environmental have been evaluated for potential receipt and processing at CES. These samples are water evaluation 0709-03 and oil evaluation 0709-04. This is a one-time potential receipt of 8 drums of water and 22 drums of oil. Overall, the water can be discharged without treatment and/or used as equalization water. The oil may be blended with any base oil or black oil and/or sold "as is".

Evaluation 0709-03 is water with a vivid pink appearance. This sample was originally supposed to be some type of oil, but it is totally water miscible. It does not blend with oil. This sample was tested neat and not "water treated". While it may be treated and treats okay, there is no reason to do so. The sample has a pH of 10, TOC of 4397 and metals that are all acceptable. I could not test for phenols due to its color. Joe, you need to verify that all eight of these drums are water based and not oil, since this is supposed to be unused product. I also checked to see if this material is possibly a weak glycol, which it is not. These verified water drums can just be processed as any water.

Evaluation 0709-04 is pale yellow oil with a color of 1.5. It is totally miscible with either black oil or base oil. It has a density of 0.844 with only 39 ppm water. The chlor-d-tect is less than 100 ppm. It has a non typical oil odor, but an acceptable odor. We can blend this material with black or even base oil or possibly sell "as is". Its acquisition is recommended. The table below summarizes the analytical testing.

Future Environmental		
	Evaluation 0709-03	Evaluation 0709-04
Odor	Acceptable	Acceptable
pH	10	
Density		0.844
Black/Base oil suitability		Yes
Color		1.5
Chlor-d-tect, ppm		<100
Water, ppm	0	39
Treatability	Okay/not needed	
TOC, ppm	4397	
Metals, ppm		
Ni	0.000	
Zn	0.066	
Cu	0.064	
Cd	0.016	
Cr	0.088	

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker, Sarai Melichar, Jay Matlock
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 7/01/09

From: Miles Root

Lab Memo: 09-131

Subject: **Transmontaigne Oil Evaluation 0609-48**

A sample of black oil from Transmontaigne has been evaluated for potential receipt and marketing by CES. This sample is evaluation 0609-48 and represents a one-time acquisition of approximately 23,000 gallons of material. Overall, this is oil has particulates issues and will need processing to remove the fine solids that it contains. It is recommended for acquisition if we can market it profitably, but pricing will depend upon its marketability either "as is" or after processing at PACES.

This oil mixes well with our black oil and is totally miscible with toluene. A top and bottom sample were looked at visually and then mixed together on a 1:1 basis for testing. The mixture blends well with our black oil.

Unfortunately both the top and bottom samples contain very fine silt like solids. These are not really chunk solids but rather fine silt that does not allow the oil to completely flow off the sides of a sample container. These silts like solids can be centrifuged out and form a sludge layer on the bottom of a centrifuge tube. They are difficult to quantitate, but certainly less than 5%. They do not process out with heat. Pricing will depend upon the marketability of this material. If we can't sell it "as is", we have the option of processing at PACES when they have the centrifuge up and running. This final decision will be left up to operations.

The table below summarizes the analytical testing.

Transmontaigne	
Evaluation 0609-48	
Solids, vol%	2-4
Black Oil Suitability	Yes
Chlor-d-tect, ppm	900
API Gravity	18
Water, %	3.59
Aash, wt%	1.45
Issues	Fine silt

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To: Joy Baker, Sarai Melichar, Jay Matlock
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 7/01/09

From: Miles Root

Lab Memo: 09-131

Subject: **Transmontaigne Oil Evaluation 0609-48**

A sample of black oil from Transmontaigne has been evaluated for potential receipt and marketing by CES. This sample is evaluation 0609-48 and represents a one-time acquisition of approximately 23,000 gallons of material. Overall, this is oil has particulates issues and will need processing to remove the fine solids that it contains. It is recommended for acquisition if we can market it profitably, but pricing will depend upon its marketability either "as is" or after processing at PACES.

This oil mixes well with our black oil and is totally miscible with toluene. A top and bottom sample were looked at visually and then mixed together on a 1:1 basis for testing. The mixture blends well with our black oil.

Unfortunately both the top and bottom samples contain very fine silt like solids. These are not really chunk solids but rather fine silt that does not allow the oil to completely flow off the sides of a sample container. These silts like solids can be centrifuged out and form a sludge layer on the bottom of a centrifuge tube. They are difficult to quantitate, but certainly less than 5%. They do not process out with heat. Pricing will depend upon the marketability of this material. If we can't sell it "as is", we have the option of processing at PACES when they have the centrifuge up and running. This final decision will be left up to operations.

The table below summarizes the analytical testing.

Transmontaigne	
Evaluation 0609-48	
Solids, vol%	2-4
Black Oil Suitability	Yes
Chlor-d-tect, ppm	900
API Gravity	18
Water, %	3.59

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Fax. (713) 676-1676

To: Joy Baker, Sarai Melichar, Jay Matlock
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 7/01/09

From: Miles Root

Lab Memo: 09-131

Subject: **Transmontaigne Oil Evaluation 0609-48**

A sample of black oil from Transmontaigne has been evaluated for potential receipt and marketing by CES. This sample is evaluation 0609-48 and represents a one-time acquisition of approximately 23,000 gallons of material. Overall, this is oil has particulates issues and will need processing to remove the fine solids that it contains. It is recommended for acquisition if we can market it profitably, but pricing will depend upon its marketability either "as is" or after processing at PACES.

This oil mixes well with our black oil and is totally miscible with toluene. A top and bottom sample were looked at visually and then mixed together on a 1:1 basis for testing. The mixture blends well with our black oil.

Unfortunately both the top and bottom samples contain very fine silt like solids. These are not really chunk solids but rather fine silt that does not allow the oil to completely flow off the sides of a sample container. These silts like solids can be centrifuged out and form a sludge layer on the bottom of a centrifuge tube. They are difficult to quantitate, but certainly less than 5%. They do not process out with heat. Pricing will depend upon the marketability of this material. If we can't sell it "as is", we have the option of processing at PACES when they have the centrifuge up and running. This final decision will be left up to operations.

The table below summarizes the analytical testing.

Transmontaigne	
Evaluation 0609-48	
Solids, vol%	2-4
Black Oil Suitability	Yes
Chlor-d-tect, ppm	900
API Gravity	18
Issues	Fine silt

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Camp, Jennifer Rust

Date: 7/01/09

Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown
From: Miles Root

Lab Memo: 09-130

Subject: **Oceaneering NW Waste Water Evaluation 0609-44**

A sample of waste water from Oceaneering NW has been evaluated for potential processing at CES. This sample is evaluation 07609-44. This is a one-time potential receipt of approximately 3 totes of water generated from the floor cleaning of a new office building. Overall, this water treats without issue and this stream is recommended for acquisition and processing at CES.

This water is dark gray in appearance with a faint odor of detergent or soap. It contains 8% solids by centrifuge, which looks like fine concrete dust. Since this is coming from the cleaning of some type of floor, it probably is just that.

This water has a pH of 11. It treats easily and readily forms a nice large floc which readily phase separates out. The treated water has no phenols, TOC of 2216 and acceptable metals. The solids present all end up in the floc and the treated water looks nice and clear. There will be no issues with this water treatment and it acquisition and processing at CES are recommended.

The table below summarizes the analytical testing.

Oceaneering NW	
Evaluation 0609-44	
Solids, vol%	8
Odor	slight detergent
pH	11
Phenols, ppm	0
TOC, mg/L	2,216
Oil, vol%	0
Treatability	okay
Metals, ppm	
Ni	0.005
Zn	0.013
Cu	0.172
Cd	0.001
Cr	0.013

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Camp
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown
From: Miles Root

Date: 7/01/09

Lab Memo: 09-129

Subject: **C4 Environmental Waste Water Evaluation 0709-01**

A sample of waste water from C4 Environmental has been evaluated for potential processing at CES. This sample is evaluation 0709-01. This is a one-time potential receipt of approximately 8000 gallons. This water contains less than 1% by volume of gasoline that may be recovered, the remainder being treatable water. This stream is recommended for acquisition and processing at CES.

This water contains a very small layer of gasoline, being less than 1% by volume. A flash point on the water that has allowed the gasoline to phase separate to the top is greater than 140 deg F. The water has a gasoline odor and is murky in appearance, but free of real solids. The pH is 6.

The water phase treats out nicely and forms a floc which quickly separates out. The treated water is high in phenols at 75 ppm. Trichlor or water equalization will be needed to deal with this. The TOC is 1653 ppm and the metals are all acceptable. This low TOC indicates that no heat treatment is required to break out the gasoline.

This material when received should have the water drawn off the bottom of the trailer; with the small gasoline layer either going into light ends type material or even black oil. There's really not that much there, and even at 1%, that equates to only 80 gallons for this 8000 gallon receipt. This stream may be brought in as a recyclable, and it will carry the D001 code. The table below summarizes the analytical testing.

C4 Environmental	
Evaluation 0709-01	
Flash Point, deg F	>140
Solids, vol%	0
Odor	gasoline
pH	6
Phenols, ppm	75
TOC, mg/L	1,653
Oil, vol%	<1%
Treatability	okay
Metals, ppm	
Ni	0.000
Zn	0.005
Cu	0.068
Cd	0.001
Cr	0.018

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman, Jennifer Rust
Cc: Prabhaker, Clint Hopkins, Sam Brown

Date: 6/29/09

From: Miles Root

Lab Memo: 09-128

Subject: **Kinder Morgan Evaluation 0609-42**

A sample of waste water from Kinder Morgan, Pasadena, has been evaluated for potential processing at CES. This sample is evaluation 0609-42. This sample represents one vacuum box of water. This water may be treated at CES and will involve solids removal from the box for disposal. Its acquisition is recommended.

I have no additional information on this waste water. The sample contains approximately 25% solids by centrifuge. The water has a light hydrocarbon odor and a pH of 7. It treats easily and forms a nice floc that readily phase separates. The treated water has no phenols, TOC of 1012 ppm and low metals. There are no issues with this water other than the potential disposal of the solids. The table below summarizes the analytical testing.

Kinder Morgan	
Evaluation 0609-42	
Solids, vol%	25
Odor	light hydrocarbon
pH	7
Phenols, ppm	0
TOC, mg/L	1,012
Oil, vol%	0
Treatability	Okay
Metals, ppm	
Ni	0.000
Zn	0.001
Cu	0.016
Cd	0.000
Cr	0.000

Laboratory Analysis Report

Total Number of Pages: 6

Job ID : 09070008

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
0609-47

Report To :	Client Name:	CES Environmental	P.O.#.: 0609-47
	Attn:	Miles Root	Sample Collected By:
	Client Address:	4904 Griggs Rd	Date Collected: 07/01/09
	City, State, Zip:	Houston, Texas, 77021	

A&B Labs has analyzed the following samples...

Client Sample ID	Matrix	A&B Sample ID
0609-47	Sludge	09070008.01

Shantall Carpenter

Released By: Shantall Carpenter
Title: Project Manager
Date: 7/10/2009

nelap

This Laboratory is NELAP (T104704213-09-TX) accredited. Effective: 07/01/2009; Expires: 06/30/2010
Scope: Non-Potable Water, Drinking Water, Air, Solid, Hazardous Waste
I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted in the attached exception reports. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been identified in the Laboratory Review Checklist, and that no information or data have been knowingly withheld that would affect the quality of the data.

Date Received : 07/01/2009 09:45

LABORATORY TERM AND QUALIFIER DEFINITION REPORT

Job ID : 09070008

Date: 7/10/2009

General Term Definition

Back-Wt	Back Weight	Post-Wt	Post Weight
BRL	Below Reporting Limit	ppm	parts per million
cfu	colony-forming units	Pre-Wt	Previous Weight
Conc.	Concentration	Q	Qualifier
D.F.	Dilution Factor	RegLimit	Regulatory Limit
Front-Wt	Front Weight	RPD	Relative Percent Difference
LCS	Laboratory Check Standard	RptLimit	Reporting Limit
LCSD	Laboratory Check Standard Duplicate	SDL	Sample Detection Limit
MS	Matrix Spike	surr	Surrogate
MSD	Matrix Spike Duplicate	T	Time
MW	Molecular Weight	TNTC	Too numerous to count

Qualifier Definition

LABORATORY TEST RESULTS

Job ID : 09070008

Date 7/10/2009

Client Name: CES Environmental

Attn: Miles Root

Project Name: 0609-47

Client Sample ID: 0609-47

Date Collected: 07/01/09

Time Collected: 07:30

Other Information:

Job Sample ID: 09070008.01

Sample Matrix Sludge

Test Method	Parameter/Test Description	Result	Units	DF	Rpt Limit	Reg Limit	Q	Date Time	Analyst
SW-846 8021B	TCLP BTEX & MTBE								
	Benzene	0.0028	mg/L	1	0.002	0.5		07/02/09 11:39	HK
	Trifluorotoluene(surr)	90.4	%	1	75-125			07/02/09 11:39	HK

QUALITY CONTROL CERTIFICATE

Job ID : 09070008 **Date :** 7/10/2009

Analysis : TCLP BTEX & MTBE **Method : SW-846 8021B** **Reporting Units : mg/L**

QC Batch ID : Qb09070620 **Created Date :** 07/06/09 **Created By :** Hkhuc

Samples in This QC Batch : 09070008.01

Sample Preparation : PB09070616 **Prep Method :** SW-846 5030C **Prep Date :** 07/02/09 10:30 **Prep By :** Hkhuc
TCLP Prep : PB09070215 **Prep Method :** SW-846 1311 **Prep Date :** 07/01/09 16:35 **Prep By :** Ksudha

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	RptLimit		Qual
Benzene	71-43-2	BRL	mg/L	1	0.002		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Benzene	0.02	0.02	100	0.02	0.02	100	0	30	79.1-123	

QC Type: MS and MSD
QC Sample ID: 09070054.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Benzene	BRL	0.02	0.023	115						65-143	

Refer to the Definition page for terms.

EPAHO113001045

CES Environmental Services, Inc.

09070008

TESTING LABORATORY IDENTIFICATION & INFORMATION:
A & B LABS.
10100 EAST FWY SUITE 100
713-453-6060

CHAIN of CUSTODY RECORD

CES Environmental Services, Inc.
4904 Griggs Road
Houston, TX 77021
Main Number: (713) 676-1460
Fax Number: (713) 676-1676

Test Results Reporting
CES Environmental Services, Inc.
Main Number: (713) 676-1460
Fax Number: (713) 676-1676

Project Name	Sample Name	Comments/Special Instructions:
	0609-47	**Turnaround Time Required:**
Contact: MILES ROOT	832-607-6678	DATE and/or Number of Days: STANDARD
SAMPLER: PRINT: MILES ROOT SIGN: [signature]		**OTHER INFORMATION:** SLUDGE
Type and Number of Containers (CIRCLE): Glass 1 2 3		SAMPLE NAME/ID ('s): 0609-47
Grab 4 5 6	Other:	**CES Sample LOG BK Number ('s):** 0609-47

Requested Analysis : TCLP BENZENE ☐ ☐

Relinquished By	Date	Time	Received By	Date	Time
1. Relinquished By: [signature]	7/1/09	9:20A.	2. Received By: [signature]	7/1/09	9:21A.
3. Relinquished By: [signature]	7/1/09	9:45A.	4. Received By:		
5. Relinquished By:			6. Received By: [signature]	7/1/09	9:45

Sample Condition Checklist

Date : **07/10/09**

A&B JobID : **09070008**	Date Received : **07/01/2009**	Time Received : **9:45AM**
Client Name : **CES Environmental**		
Temperature : **18.6°C**	Sample pH : **n/a**	

	Check Points	Yes	No
1.	Cooler seal present and signed.	N/A	
2.	Sample(s) in a cooler.	X	
3.	If yes, ice in cooler.	X	
4.	Sample(s) received with chain-of-custody.	X	
5.	C-O-C signed and dated.	X	
6.	Sample(s) received with signed sample custody seal.	N/A	
7.	Sample containers arrived intact. (If no comment).	X	
8.	Matrix : Water ☐ Soil ☐ Liquid ☐ Sludge ☑ Solid ☐ Cassette ☐ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐		
9.	Sample(s) were received in appropriate container(s).	X	
10.	Sample(s) were received with proper preservative	N/A	
11.	All samples were logged or labeled.	X	
12.	Sample ID labels match C-O-C ID's	X	
13.	Bottle count on C-O-C matches bottles found.	X	
14.	Sample volume is sufficient for analyses requested.	X	
15.	Samples were received within the hold time.	X	
16.	VOA vials completely filled.	N/A	
17.	Sample accepted.	X	

Comments : Include actions taken to resolve discrepancies/problem:

Sample cooling initiated in the field. Sample labels and chain of custody do not list collection date and time. Client stated that the sample was collected 7-1-09 at 7:30am. 7/1/09 RU

Received by : Ruwadia

Check in by/date : Ruwadia / 07/01/2009

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/29/09

From: Miles Root

Lab Memo: 09-127

Subject: **TT Barge Mile 183 Evaluation 0609-45**

A sample of waste water from TT Barge Mile 183 has been evaluated for potential processing at CES. This sample is evaluation 0609-45. This sample represents 400,000 gallons monthly of waste water receipts. While this particular sample is okay for processing, the evaluation form indicates that this water may contain up to 30% organics, which may be a problem. Further discussion will be needed on this stream.

This is fairly clean looking waste water with a trace of organics on top. It carries a D018 waste code for benzene. The water does have a hydrocarbon type of odor, but it is not strong. This water originates from the cleaning of barges. It has a pH of 6. The water treats easily; forming a nice floc that phase separates out nicely. The treated water has no phenols, TOC of 1098 and very low metals.

While this particular sample looks good for processing, we don't want to end up with hazardous waste water containing several percentages of benzene or some other organics that will be difficult to deal with. This is an operations issue and needs to be addressed. This particular sample may contain high benzene content that was not checked. Otherwise, this particular sample looks fine and is recommended for acquisition and treatment at CES. The table below summarizes the analytical testing.

TT Barge Mile 183	
Evaluation 0609-45	
Solids, vol%	trace
Odor	slight hydrocarbon
pH	6
Phenols, ppm	0
TOC, mg/L	1,098
Oil, vol%	0
Treatability	Okay
Metals, ppm	
Ni	0.000
Zn	0.002
Cu	0.005
Cd	0.000
Cr	0.000

CES Environmental
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To: Dana Carter
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/26/09

From: Miles Root

Lab Memo: 09-126

Subject: **TT Barge Mile 183 Evaluation 0609-41**

A sample of oily hazardous waste from TT Barge Mile 183, has been evaluated for potential processing at CES. This sample is evaluation 0609-41. This sample represents 4500 gallons quarterly of material per quarter. Overall, this material's potential as an additive to our black oil is not workable, and we have no other use for this material as a product. Its acquisition is not recommended.

This material contains olefins, paraffins, C9-C11 alcohols and some benzene. It also carries D0001 and D018 waste codes. The sample is tan in appearance and is multi phased. The reason this material is multi phased is that the chemicals it contains are not totally miscible with one another, so phase separate out after sitting. They initially appear to mix with black oil but phase separate out after centrifuging. The bottoms from the centrifuging appear to be the waxy paraffins. Even though the chlor-d-tect is less than 200 ppm this material does not mix with our black oil.

Since this material cannot be used as a product, and it is a hazardous waste, I recommend that we do not accept this material at CES.

CES Environmental Services, Inc.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/19/09

From: Miles Root

Lab Memo: 09-124

Subject: **Huntsman Evaluation 0609-30**

A sample of waste water from Huntsman, Conroe has been evaluated for potential processing at CES. This sample is evaluation 0609-30 and represents waste water from a chemical production. This material represents a potential of three loads per day. This is a resample of the water phase only of this material, which was initially reported in memo 09-097 on 5/27/09. This particular sample treats normally and the operations issues that will need to be dealt with are ammonia odor and high nickel. Since this stream does not treat like the first sample, an explanation is needed as to the sample differences. What waste water will we really be receiving? If it is determined that we can handle the odor and nickel issues on a routine basis, then this stream is acceptable for processing.

This water is murky in appearance with a strong ammonia odor. It has a pH of 11. The water treats normally and forms very fine silty solids which phase separate out okay. The treated water has a very strong ammonia odor. The TOC on the treated water is 22,540 ppm, there are no phenols, and the nickel is 2.9 ppm. An ammonia field test done on the treated water shows it to be from 60 - 100 ppm as ammonia.

The odor of this material is a concern. This is going to be a judgment call by operations as to whether or not this will be an issue. It would be nice to have a load of this water on a trial basis to see how it behaves on a large scale. In the lab the odor of ammonia is very strong when a very small amount of sample is treated. We will also need equalization water to deal with the high nickel level of this water.

I wonder what the original sample from May actually represented. How consistent is this stream going to be? What level of nickel are we really going to be receiving on a continual basis from this customer? We have two data points of this water, both of them a little different and statistically there is no reason to throw out either one.

The table below summarizes the analytical testing.

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Huntsman	
Evaluation 0609-30	
Solids, vol%	0
Odor	Strong Ammonia
pH	11
Phenols, ppm	0
TOC, mg/L	22,540
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	2.907
Zn	0.154
Cu	0.148
Cd	0.026
Cr	0.000

Laboratory Analysis Report

Job ID : 09060695

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
0609-35

Report To :	Client Name:	CES Environmental	P.O.#.: 0609-35
	Attn:	Miles Root	Sample Collected By:
	Client Address:	4904 Griggs Rd	Date Collected: 06/24/09
	City, State, Zip:	Houston, Texas, 77021	

A&B Labs has analyzed the following samples...

Client Sample ID	Matrix	A&B Sample ID
0609-35	Liquid	09060695.01

HUNTSMAN

Shantall Carpenter

Released By: Shantall Carpenter
Title: Project Manager
Date: 07/01/2009

This Laboratory is NELAP (T104704213-08B-TX) accredited. Effective: 07/01/2008; Expires: 06/30/2009
Scope: Non-Potable Water, Drinking Water, Air, Solid, Hazardous Waste
I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted in the attached exception reports. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been identified in the Laboratory Review Checklist, and that no information or data have been knowingly withheld that would affect the quality of the data.

Date Received : 06/24/2009 14:43

LABORATORY TEST RESULTS

Job ID : 09060695

Date 7/1/2009

Client Name:	CES Environmental	Attn: Miles Root
Project Name:	0609-35	

Client Sample ID:	0609-35	Job Sample ID:	09060695.01
Date Collected:	06/24/09	Sample Matrix	Liquid
Time Collected:			
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	Rpt Limit	Reg Limit	Q	Date Time	Analyst
SM 4500NH3D	Total Kjeldahl Nitrogen								
	TKN	16219	mg/L	5000	2500			06/29/09 07:46	KS

EPAHO113001053

QUALITY CONTROL CERTIFICATE

Job ID : 09060695 **Date :** 7/1/2009

Analysis : Total Kjeldahl Nitrogen **Method : SM 4500NH3D** **Reporting Units : mg/L**

QC Batch ID : Qb09062903 **Created Date :** 06/29/09 **Created By :** Ksudha

Samples in This QC Batch : 09060695.01

Sample Preparation : PB09062906 **Prep Method :** SM 4500NH3D **Prep Date :** 06/29/09 07:45 **Prep By :** Ksudha

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	RptLimit		Qual
TKN		BRL	mg/L	1	0.5		

QC Type: Duplicate

QC Sample ID: 09060610.01

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
TKN	1.1	1.2	mg/L	8.7	20		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
TKN	5	4.1	82.9	5	4.3	86.9	4.7	20	80-120	

QC Type: MS and MSD
QC Sample ID: 09060610.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
TKN	1.2	5	6.9	114						80-120	

 Refer to the Definition page for terms.

LABORATORY TERM AND QUALIFIER DEFINITION REPORT

Job ID : 09060695 Date: 7/1/2009

General Term Definition

Back-Wt	Back Weight	Post-Wt	Post Weight
BRL	Below Reporting Limit	ppm	parts per million
cfu	colony-forming units	Pre-Wt	Previous Weight
Conc.	Concentration	Q	Qualifier
D.F.	Dilution Factor	RegLimit	Regulatory Limit
Front-Wt	Front Weight	RPD	Relative Percent Difference
LCS	Laboratory Check Standard	RptLimit	Reporting Limit
LCSD	Laboratory Check Standard Duplicate	SDL	Sample Detection Limit
MS	Matrix Spike	surr	Surrogate
MSD	Matrix Spike Duplicate	T	Time
MW	Molecular Weight	TNTC	Too numerous to count

Qualifier Definition

CES Environmental Services, Inc.

TESTING LABORATORY IDENTIFICATION & INFORMATION:
A+B LABS
10100 EAST FWY SUITE 100
713-453-6060

09060695

CHAIN of CUSTODY RECORD

CES Environmental Services, Inc.
4904 Griggs Road
Houston, TX 77021
Main Number: (713) 676-1460
Fax Number: (713) 676-1676

Test Results Reporting
CES Environmental Services, Inc.
Main Number: (713) 676-1460
Fax Number: (713) 676-1676

Project Name	Sample Name	Comments/Special Instructions:
	0609-35	**Turnaround Time Required:**
Contact: MILES ROOT 832-607-6678		DATE and/or Number of Days: 1 WEEK
SAMPLER: PRINT: MILES ROOT SIGN: Miles Root		**OTHER INFORMATION:**
Type and Number of Containers (CIRCLE): Glass 1 2 3 Grab 4 5 6 Other:		SAMPLE NAME/ID ('s): 0609-35 **CES Sample LOG BK Number ('s):** 0609-35

Requested Analysis : TKN

☐
☐

Relinquished By	Date	Time	Received By	Date	Time
1. Relinquished By: Miles Root	06/24/09	1:00 P.M.	2. Received By: [illegible signature]	6/24/09	1:00PM
3. Relinquished By: [illegible signature]	6/24/09	2:43P.	4. Received By:		
5. Relinquished By:			6. Received By: Arun Ramakrishna	6/24/09	2:43P

Sample Condition Checklist

Date : 07/01/09

A&B JobID :	09060695	Date Received :	06/24/2009	Time Received :	02:43 PM
Client Name :	CES Environmental				
Temperature :	30.0°C	Sample pH :	<12(TKN)		

	Check Points	Yes	No
1.	Cooler seal present and signed.	X	
2.	Sample(s) in a cooler.		X
3.	If yes, ice in cooler.		X
4.	Sample(s) received with chain-of-custody.	X	
5.	C-O-C signed and dated.	X	
6.	Sample(s) received with signed sample custody seal.	N/A	
7.	Sample containers arrived intact. (If no comment).	X	
8.	Matrix : Water ☐ Soil ☐ Liquid ☑ Sludge ☐ Solid ☐ Cassette ☐ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐		
9.	Sample(s) were received in appropriate container(s).	X	
10.	Sample(s) were received with proper preservative		X
11.	All samples were logged or labeled.	X	
12.	Sample ID labels match C-O-C ID's	X	
13.	Bottle count on C-O-C matches bottles found.	X	
14.	Sample volume is sufficient for analyses requested.	X	
15.	Samples were received within the hold time.	X	
16.	VOA vials completely filled.	N/A	
17.	Sample accepted.	X	

Comments : Include actions taken to resolve discrepancies/problem:

Samples were collected and brought immediately to the lab. Sample need to be acidified by analyst using lot #LLT09061009

Received by :

Check in by/date : Ruwadia / 6/24/2009

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Camp
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/19/09

From: Miles Root

Lab Memo: 09-123

Subject: **MIC Group Evaluation 0609-28 - Updated**

A sample of oily water from MIC Group has been evaluated for potential processing at CES. This sample is evaluation 0609-28 and is said to contain water, oil and soap. This material represents 500 gallons of material three times per quarter. Overall, the oil from this sample does not pass the chlor-d-tect test, so we cannot handle it here at CES.

This sample by centrifuge contains 50% oil, 10% rag, 8% solids and 32% water. The sample comes as an emulsion but can be broken out with standard heat and acid treat. The water treats easily and forms a nice floc. The phase separated oil has a chlor-d-tect value of over 4000 ppm, which does not even allow for a rebuttal to potentially accept this oil. At the 4000 ppm endpoint this sample was not even close to changing color for an endpoint, so the chlor-d-tect value is much greater than 4000 ppm. The pH on this mixture is 7 with a flash point greater than 140 deg F. This material will need to be sent out for RCRA metals if metals are required for hazardous waste classification, or supplied by the customer.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
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To: Joe Camp
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/19/09

From: Miles Root

Lab Memo: 09-123

Subject: **MIC Group Evaluation 0609-28**

A sample of oily water from MIC Group has been evaluated for potential processing at CES. This sample is evaluation 0609-28 and is said to contain water, oil and soap. This material represents 500 gallons of material three times per quarter. Overall, the oil from this sample does not pass the chlor-d-tect test, so we cannot handle it here at CES.

This sample by centrifuge contains 50% oil, 10% rag, 8% solids and 32% water. The sample comes as an emulsion but can be broken out with standard heat and acid treat. The water treats easily and forms a nice floc. The phase separated oil has a chlor-d-tect value of over 4000 ppm, which does not even allow for a rebuttal to potentially accept this oil. At the 4000 ppm endpoint this sample was not even close to changing color for an endpoint, so the chlor-d-tect value is much greater than 4000 ppm. Since we cannot receive oil with this level of organic chlorides no further work was performed.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/19/09

From: Miles Root

Lab Memo: 09-123

Subject: **<u>Phoenix Pollution Control Evaluation 0609-29</u>**

A sample of liquid waste from Phoenix Pollution Control, via DTX Oil, Channelview, has been evaluated for potential processing at CES. This sample is evaluation 0609-29 and is said to represent a one-time acquisition of approximately 2000 gallons of oil and water. Overall, this material is not the oil and water it is claimed to be and we cannot handle it at CES as such.

This sample has a density of 1.25, a pH of 7 and contains no oil. It is very dark in appearance and contains over 50% sludge in the bottom of the container. The liquid layer does not respond to our waste water treatment protocol. In other words, it does nothing when acidified and then pH adjusted with lime along with polymer addition. I'm not sure just what chemical it is, but it is not just water nor does not fit our treatment scheme here at CES and is not recommend.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman, Jenny Rust
Cc: Prabhaker, Clint Hopkins, Sam Brown

Date: 6/18/09

From: Miles Root

Lab Memo: 09-122

Subject: **Kinder Morgan Evaluation 0609-27**

A sample of waste water and solids from Kinder Morgan has been evaluated for potential processing at CES. This sample is evaluation 0609-27. This sample represents material in a vacuum box that is a potential single load receipt. Overall, we can process the water from this box and hopefully the solids as well, but they will need to be tested for benzene beforehand.

This sample is basically from a tank cleaning operation. The solids appear to be dirt, rust and scale with a trace of organics. The solids in the sample are approximately 75%. The water contains no recoverable oil. Vigorous mixing of the solids with water results in the recovery of a trace amount of oil. For all practical purposes there is no recoverable oil from the solids.

The water can be sucked out of the vacuum box and treated. The water treats easily and forms a nice floc which separates out nicely. The water has no phenols, TOC of 1269 and acceptable metals. There are no issues with the water. The solids will need to be tested for benzene since this is always suspect on this type of stream. If the testing of the solids shows them to be non hazardous, then they can go into a Class 1 box.

The table below summarizes the analytical testing.

Kinder Morgan	
Evaluation 0609-27	
pH	7
Phenols, ppm	0
TOC, mg/L	1269
Odor	Hydrocarbon
Solids, vol%	75
Oil, vol%	trace
Treatability	OK
Metals, ppm	
Ni	0.017
Zn	0.088
Cu	0.008
Cd	0.004
Cr	0.000

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Camp
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/18/09

From: Miles Root

Lab Memo: 09-120

Subject: **Longwood Elastomers Oil/Water Evaluation 0609-21**

A sample of oil and water from Longwood Elastomers has been tested for potential processing at CES. This sample is evaluation 0609-21. The potential for this material is approximately 1500 gallons per year. Overall, we can take this oil and water and treat them at CES.

This sample is approximately 73% oil with 27% water and has a pH of 7. The sample has two distinct phases. I initially shook the sample to mix the oil and water back together. This formed only a nasty emulsion which only slowly began to phase separate after heating the sample and allowing it to sit overnight. We will want to take the water off this load when it arrives and then move the oil layer to the back. Emulsions formed with this oil will be difficult to break.

The oil is medium brown in appearance with a murky look and has around 18% water. This water content will change as the oil is allowed to sit and phase out. Just sitting in a separatory funnel overnight I noticed that additional water had phased out from the oil. The brown oil mixes with black oil and is readily soluble in toluene. The chlor-d-tect is only 300 ppm, so it is good material. A flash point on the oil/and water emulsion that I produced is greater than 140 deg F.

The water phase treats easily and forms a nice large floc that readily separates out. The treated water has 5 ppm phenols, TOC of 1294 and acceptable metals. There are no issues with this water.

We want to make sure we separate out the water when this material arrives and then move the oil layer to the back for heat treat to reduce the water. There is a distinct phase separation so it should be discernable when we pump it off the trailer. This stream should be straight forward in its treatment and is recommended for acquisition and processing.

The table below summarizes the analytical testing.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Longwood Elastomers	
Evaluation 0609-21	
Flash Point, deg F	>140
Solids, vol%	1%
Odor	Not Objectionable
pH	7
Phenols, ppm	5
TOC, mg/L	1,294
Oil, vol%	73
Chlor-d-tect, ppm	300
Water in Oil, vol%	18.3
Treatability	OK
Metals, ppm	
Ni	0.000
Zn	0.034
Cu	0.036
Cd	0.001
Cr	0.202

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Services, Inc.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman, Jenny Rust
CC: Prabhaker, Clint Hopkins, Sam Brown

Date: 6/18/09

From: Miles Root

Lab Memo: 09-121

Subject: **KMCO Amines Evaluation 0609-26**

A sample of amines from KMCO has been evaluated for potential processing at CES. This sample is evaluation 0609-26. It is a sample of amines with a small water layer below. Volume is stated as 6100 gallons.

This sample is not waste water by definition do to the fact that it is essentially a pure product without water. The sample has a pH of 12.2 so it will not carry the D002 code as indicated on the evaluation sheet. Any mixing of these amines with water forms an emulsion, as they appear to be essentially insoluble in water. A little bit of water forms such a thick emulsion that it is of a paste consistency.

We can take this material as a Class 1 waste and dispose of in a sludge box. Pricing spreadsheet shows from \$70 - \$85 per cubic yard for this work. The 6100 gallons is 30 cubic yards, which converts to \$2100 - \$2550 for our cost.

CES Environmental Services, Inc.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/17/09

From: Miles Root

Lab Memo: 09-119

Subject: **Dynamic Rentals Waste Water Evaluation 0609-24**

A sample of waste water from Dynamic Rentals has been tested for potential processing at CES. This sample is evaluation 0609-24 and is waste water containing a small amount of hydraulic oil. This is a one-time acquisition of approximately 35,000 gallons. Overall, this is very good looking water with only a small amount of oil, and its acquisition and processing is recommended.

This water is water white with a floating oil layer of 0.6%. There is no need to heat treat this water, as the oil is floating on top and the water can just be drawn down to the very small oil layer. The water has a very slight septic odor, but it is not objectionable. The water has a pH of 8. It treats very easily and forms a nice large floc which readily phase separates out.

The treated water has no phenols, TOC of only 1689 ppm and totally acceptable metals. When we bring this water in it will go to the front where it will be discharged until the oil layer appears. This small amount of oil (at 6% this would be only 30 gallons in a 5000 gallon trailer) will go to the back. There will be no issues with this water and it will make excellent equalization water if needed.

The table below summarizes the analytical testing.

Dynamic Rentals	
Evaluation 0609-24	
pH	8
Phenols, ppm	0
TOC, mg/L	1689
Odor	Acceptable
Oil, vol%	0.6
Treatability	OK
Metals, ppm	
Ni	0.000
Zn	0.000
Cu	0.004
Cd	0.000
Cr	0.000

CES Environmental Services, Inc.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
CC: Matt Bowman, Jay Matlock, Prabhaker,
From: Miles Root

Date: 6/17/09

Lab Memo: 09-118

Subject: **Murphy Oil Cresylic Caustic Testing – Evaluation 0609-25**

A sample of cresylic caustic from Murphy Oil, Meraux, LA has been tested for use at PACES. This sample is evaluation 0609-25. The standard caustic testing was performed, to include wet crude acid oil. Overall, this is a good looking caustic with a high caustic strength. This high caustic strength has allowed a very good wet crude value of 32%. While this is not a net acid value, we will use it as an indicator of recoverable acid. Carbonates are not needed for the cresylic caustic testing, and are not included.

The table below summarizes the analytical testing.

Murphy Oil, Meraux, LA	
Evaluation 0609-25	
Wet crude, vol%	32
Specific Gravity	1.2
NaOH, wt%	18.3
Sulfide, as S, wt%	0.08
RSH, as S, wt%	0.15

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/16/09

From: Miles Root

Lab Memo: 09-117

Subject: **MEMC Evaluation 0609-20**

A sample of waste water from MEMC, Pasadena, has been evaluated for processing at CES. This sample is evaluation 0609-20 and is water from the washing down of equipment. This stream will generate monthly approximately 50 loads of water over a 48 hour period. Overall, this stream is acceptable for processing at CES and is recommended.

This particular sample is water white and has a pH of 8 with almost no discernable odor. The accompanying data sheet indicates this water may range from water white to brown in appearance. The water needs only a small amount of ferric and sulfuric acid added, along with the respective lime, to produce a floc that will quickly phase separate out. It appears that an excess amount will not allow the solids to phase separate quickly. The treated water has no phenols, TOC of only 1161 ppm and acceptable metals.

The accompanying data sheet indicates that toluene and dimethoxyethane may be present as impurities in this water at very low levels. The data shows these compounds are typically not present in measurable levels or at very low levels in this water, so these should not be a concern. Also noted are fluorides that are typically less than 100 ppm but may spike infrequently to the 2000 ppm range. The overall average of these water loads should be well under 100 ppm and I don't believe it will be a concern.

This water is recommended for acquisition and should be easy to process. The table below summarizes the analytical testing.

MEMC	
Evaluation 0609-20	
pH	8
Phenols, ppm	0
TOC, mg/L	1161
Odor	Acceptable
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	0.000
Zn	0.004
Cu	0.066
Cd	0.000
Cr	0.000

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/15/09

From: Miles Root

Lab Memo: 09-116

Subject: **TT Barge Evaluation 0609-19**

A sample of waste water from TT Barge, mile 83, has been evaluated for processing at CES. This sample is evaluation 0609-19 and represents a one-time acquisition of approximately 5,000 gallons of waste water. This water is produced from the cleaning of barges. Overall, this material looks acceptable for processing at CES and is recommended for acquisition.

This sample is murky in appearance with an odor of a cleaning solution which is not objectionable. It has a pH of 11. There are no oils and only a trace of solids. The water treats easily and forms a nice floc which readily separates out. The treated water retains a slightly murky appearance.

The treated water has no phenols, a TOC of 3404 ppm and acceptable metals. We will have no issues treating this water and it is recommended for acquisition and treatment at CES. The table below summarizes the analytical testing.

TT Barge	
Evaluation 0609-19	
pH	11
Phenols, ppm	0
TOC, mg/L	3404
Solids, vol%	trace
Odor	Acceptable
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	0.000
Zn	0.000
Cu	0.043
Cd	0.001
Cr	0.159

CES Environmental Services, Inc.

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Fax. (713) 676-1676

To: Joy Baker
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/15/09

From: Miles Root

Lab Memo: 09-115

Subject: **IDS Evaluation 0609-18**

A sample of waste water with polymer from IDS has been evaluated for processing at CES. This sample is evaluation 0609-18 and represents a one-time acquisition of approximately 70,000 – 85,000 gallons of material. This water is produced from equipment cleaning and flushing from a polymer manufacturer. Overall, this material looks acceptable for processing at CES and is recommended for acquisition.

This sample contains approximately 5% polymer which does settle to the bottom of the sample bottle in a matter of a few minutes. Treatment of the sample with or without the polymer material does not seem to matter in the way it treats, so we should move any solids forward into the treatment tanks. The water has a pH of 6 and an organic odor that is only slightly objectionable. A flash point run on the water shows it to be greater than 140 deg F. The water treats easily and forms a nice floc which quickly separates out. TOC on the water is 13,670 ppm. There are no phenols and the metals are all at acceptable levels.

This water is acceptable for processing and should be any easy treat. Pricing should include charges for higher TOC value. We should also watch that we do not receive a load of mostly polymer from the bottom of any tank in which this material may be stored, as it does settle out. The table below summarizes the analytical testing.

IDS	
Evaluation 0609-18	
pH	6
Phenols, ppm	0
TOC, mg/L	13,670
Odor	Slightly Objectionable
Flash Point, deg F	>140
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	0.091
Zn	0.030
Cu	0.232
Cd	0.004
Cr	0.000

CES Environmental Services, Inc.

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To: Joe Camp, Gary Brauckman
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown
From: Miles Root

Date: 6/12/09

Lab Memo: 09-114

Subject: **Harvest Pipeline Evaluation 0609-17**

A sample of oil and water from Harvest Pipeline, Pearsall, TX, has been evaluated for processing at CES. This sample is evaluation 0609-17 and represents a one-time acquisition of approximately 100 barrels of oil mixed with water. We have the potential to receive essentially the water phase with a slight chance of acquiring the oil portion. Overall, we can take and process the water, with the oil needing further processing.

This sample is around 70% oil and is two phases. The oil is more like blended asphalt oil from its odor and is black in appearance. It is rather sticky and contains both suspended chunks or solids and some sludge that has settled out to the bottom of the container. This oil portion really needs to be centrifuged to remove these impurities. A chlor-d-tect on this oil is only 100 ppm. It blends easily with black oil and is totally miscible with toluene.

The water can be phase separated out with just a little bit of the oil remaining. I was able to treat a clean looking water sample. The pH of this water is 7 and it does not flash below 140 deg F. The water treats very easily and forms a nice large floc which readily falls out. The treated water has no phenols, TOC of 1438 ppm and very low metals.

The acquisition of this water phase is highly recommended and it should pose no issues for us. The oil will need to be centrifuged for us to market it properly. The table below summarizes the analytical testing.

Harvest Pipeline	
Evaluation 0609-17	
pH	7
Phenols, ppm	0
TOC, mg/L	1438
Odor	Acceptable
Flash Point, deg F, on water	>140
Oil, vol%	70
Chlor-d-tect. Ppm	100
Blendability with black oil	OK
Treatability	Good
Metals, ppm	
Ni	0.000
Zn	0.000
Cu	0.004
Cd	0.020
Cr	0.019

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Camp
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/11/09

From: Miles Root

Lab Memo: 09-113

Subject: **Hydrocarbon Engineering Evaluation 0609-15**

A sample of waste water from Hydrocarbon Engineering has been evaluated for processing at CES. This sample is evaluation 0609-15 and represents approximately three truck loads per week of material. This water comes from an oil recovery process, similar to what we do except no oily water is treated, only oil. Overall, we will recover no oil from this stream which will be high in phenols. If we use trichlor to reduce the phenols, or equalization water, then we can handle this stream.

This water is murky and looks as though it is oily water, but in reality it contains no recoverable oil. There is an oily film present, and the water has a flash point of 130 – 135 deg F. The water has a pH of 7, which means that this water is not recovered from a heat/acidification process or it is neutralized before shipment. The sample does have an organic type odor, but it is not offensive.

When the sample is acidified and heated, no better phase separation for the oil layer is seen than if the sample is just allowed to sit over time. Heat and acidification actually form a floc type of solids that do not phase separate out, but rather remain suspended in the water. The oil recovered by allowing the sample to sit, from approximately 800 mL of sample, is just under 1 mL, or 0.1%. Centrifuging the sample gives no better results and there is only a trace of solids.

I treated this sample without removing any "oil layer" and performed the testing. There are greater than typical amount of solids formed upon treatment, which phase separate out within a few minutes. The treated water is not clear but rather remains on the murky side. Phenols on this treated water are around 40 ppm with a TOC of 21,970 ppm. The metals are all at acceptable levels. The treated water does not flash below 140 deg F.

Phenols are the key issue on this water. We can treat with the trichlor material to reduce phenols. With the high TOC the trichlor will react with the other organics present, so it will take more than 40 gallons to treat each load. I would guess that each load will be different, so we will need to be prepared to handle each receipt on an individual basis. If we have enough equalization water on hand we can use that approach as well to reduce phenols. It will take around four loads of "good" water for each load of this particular water to reduce the phenols to adequate levels.

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Tel. (713) 676-1460
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The table below summarizes the analytical testing.

Hydrocarbon Engineering	
Evaluation 0609-15	
pH	7
Phenols, ppm	40
TOC, mg/L	21,970
Odor	Acceptable
Flash Point, deg F	130-135
Solids, vol%	Trace
Oil, vol%	0.1
Recoverable Oil	None
Treatability	OK
Metals, ppm	
Ni	0.122
Zn	1.252
Cu	0.060
Cd	0.008
Cr	0.000

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/10/09

From: Miles Root

Lab Memo: 09-112

Subject: **Bay Systems Evaluation 0609-13**

A sample of polyols mix from Bay Systems has been evaluated for potential use with black oil at CES. This sample is evaluation 0609-13 and is called a polyol mix. A polyol is an alcohol with multiple hydroxyl groups. The potential volume of this material is one load. This material mixes with black oil and can be used for that purpose. Its acquisition is recommended.

This material is fairly clear dark amber brown in appearance and has a slight ammonia/amine type odor. It is soluble in toluene and has a density of 1.072. The material mixes with black oil and does not phase separate when centrifuged out. Its flash point is greater than 140 deg F. Testing shows it to contain 7.6% water. Acquisition of this material is recommended for blending with our black oil. The table below summarizes the analytical testing.

Bay Systems	
Evaluation 0609-13	
Density	1.072
Water,%	7.6
Flash Point, deg F	>140
Black Oil Blendability	Acceptable
Odor	Slight Ammonia

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/10/09

From: Miles Root

Lab Memo: 09-111

Subject: **Bigler Evaluation 0609-12**

A sample of waste water from Bigler has been evaluated for potential processing at CES. This sample is evaluation 0609-12. This material is identified as waste water plus something else and represents one load of material. Overall, this material treats okay and is acceptable for processing at CES. Its acquisition is recommended.

This water contains a floc like material that settles out to the bottom. The resulting water looks just like clear water with the solids a light brown color. There is no odor present. The solids when spun out are just under 4%. The pH of the water is 6 and it has no phenols. The water treats easily and forms a nice floc that readily settles out. The TOC on the treated water is 1063 ppm and all of the metals are acceptable. We should have no issues with this water and it is recommended for acquisition.

The table below summarizes the analytical testing.

Bigler	
Evaluation 0609-12	
pH	6
Phenols, ppm	0
TOC, mg/L	1063
Odor	None
Solids, vol%	4
Treatability	OK
Metals, ppm	
Ni	0.000
Zn	0.001
Cu	0.121
Cd	0.000
Cr	0.000

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Camp
Date: 6/08/09
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown
From: Miles Root
Lab Memo: 09-110

Subject: **Southwest Shipyard Sulfuric Acid Evaluations 0609-05 & 06**

Two samples of sulfuric acid from Southwest Shipyard have been evaluated for potential use at CES. These samples are evaluations 0609-05 and 06. These samples supposedly represent material from barge cleaning operations and another unknown source and are a one-time acquisition. There are 19 drums of evaluation 0609-05 and 32 drums of evaluation 0609-06 material. While neither of these sources are great material, they can be used to process our waste water at CES.

Evaluation 0609-05 is a milky looking acid with a density of 1.788. This equates to an acid strength of around 85% using a density table. A semi-quantitative analysis with caustic shows this material to be around 72.5% as sulfuric acid. This is a more accurate value for the acid strength. This material has a low TOC of 374 ppm but is high in nickel, copper and chromium. Considering how much acid is used in relation to the volume of water processed, the metals are not really going to be an issue. This acid is obviously spent with something and not just virgin acid washed from a barge.

Evaluation 0609-06 is a dark looking acid with a density of 1.715. This equates to an acid strength of around 78% using a density table. A semi-quantitative analysis with caustic shows this material to be around 62.5% as sulfuric acid. As density tables are for mixtures of acid and water only they really do not apply in this particular case. This acid smells like an acid from an alkylation process and has a high TOC of 23,020. Metals are acceptable with this acid.

While neither of these acids are great material for our use, they can be used to treat our process water. The high metals and/or TOC are really not much of an issue considering we may use 100 gallons of acid to treat 50,000 gallons of water, and the dilution factor causes these issues to become non-issues. Both are recommended for acquisition if our profit is worth our time and effort. The table below summarizes the analytical testing.

Southwest Shipyard Evaluations 0609-05 & 06	0609-05	0609-06
Density	1.788	1.715
Sulfuric Acid, % by titration	72.5	62.5
TOC, mg/L	374	23,020
Metals, ppm		
Ni	7.11	1.28
Zn	0.00	0.00
Cu	2.74	0.68
Cd	0.00	0.00
Cr	5.32	1.20

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/05/09

From: Miles Root

Lab Memo: 09-109

Subject: **<u>TT Barge Evaluation 0609-04</u>**

A sample of waste water from TT Barge, mile 237, has been evaluated for potential processing at CES. This sample is evaluation 0609-04 and represents four batches per year receipts, with each batch containing approximately 20,000 gallons. This water is generated from the cleaning of barges. Overall, this water looks good for treatment initially in our heat tank to recover the trace amounts of oil and then processing the resulting water. Its acquisition is recommended.

This water has an oily sheen that phase separates out nicely with minimal heat and acid treatment. The neat water has a pH of 6 and an odor that is somewhat objectionable. It treats easily and without issues. The treated water has 5 ppm phenols, acceptable metals and a TOC of 5930 ppm. Our pricing should cover the higher TOC and heat treatment/acidification costs.

Since this is water is generated from barge cleaning operations it will be different each time it is received. This particular sample looks good for treatment and its acquisition is recommended. The table below summarizes the analytical testing.

TT Barge	
Evaluation 0609-04	
Solids, vol%	0
Odor	Somewhat objectionable
pH	6
Phenols, ppm	5
TOC, mg/L	5,930
Oil, vol%	trace
Treatability	Okay
Metals, ppm	
Ni	0.141
Zn	0.003
Cu	0.023
Cd	0.005
Cr	0.000

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Camp
CC: Matt Bowman, Prabhaker, Clint Hopkins,
Sam Brown, Jenny Rust

Date: 6/05/09

From: Miles Root

Lab Memo: 09-108

Subject: **Rohmax Evaluation 0609-03**

A sample of waste water from Rohmax has been evaluated for potential processing at CES. This sample is evaluation 0609-03 and represents approximately 2-3 loads of material. This water has a TOC around 90,000 so pricing on this stream must cover System 1 disposition or city surcharges for disposal on site. It is recommended for acquisition with pricing to cover the chosen option for disposition.

This water is dark brown in appearance with a pH of 9. There appear to be traces of hydrocarbons on top which disappear upon treatment. The water contains approximately 2% solids. Heating and acidification do nothing for breaking out any organics. Acidification of the water does release what appears to be carbon dioxide gas. The foaming produced is not excessive but very noticeable and non typical for our waste waters. The water does not flash at or below 140 deg F. This water does have an odor, but it is not offensive. Our standard water treat results in water looking essentially like the untreated water, with no real floc produced with lime addition.

The treated water has no phenols, acceptable metals and a TOC of 91,480 ppm. One can see a very slight partial sheen of "oil" on top of the treated water. System 1 or discharge at CES are both options for this water with pricing to cover costs for that which is chosen. In either case this water is recommended for acquisition. The table below summarizes the analytical testing.

Rohmax	
Evaluation 0609-03	
Flash Point, deg F	>140
Solids, vol%	2
Odor	Present but not objectionable
pH	9
Phenols, ppm	0
TOC, mg/L	91,480
Oil, vol%	trace
Treatability	Ineffectivve treatment
Metals, ppm	
Ni	0.398
Zn	0.005
Cu	0.538
Cd	0.000
Cr	0.079

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Camp
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/05/09

From: Miles Root

Lab Memo: 09-107

Subject: **Southwest Shipyard Evaluation 0609-02**

A sample of waste water from Southwest Shipyard has been evaluated for potential processing at CES. This sample is evaluation 0609-021 and represents approximately 3000 gallons of material for this one-time acquisition. Water may contain butane and a fuel additive. Overall, this material is acceptable for receipt, but needs to be used with a part of our equalization program due to its high TOC. Pricing should be somewhere in the $0.15/gallon range.

This material is amber in appearance with an unusual odor, but not offensive. This water has a pH of 9 with no solids. The water does not treat in that chemical addition does nothing to form a floc nor change the water's appearance. The lime settles out to the bottom with no indication that it is reacting in any way.

There is no reason to treat this water. The zinc is high at 3.8 ppm with the other metals being acceptable. There are no phenols but the TOC is 24,730 ppm. The water does not flash at or below 140 deg F.

A test of this water and Bigler water mixed together shows no reaction. I recommend that we bring in these 3000 gallons and divide it up into two separate tanks, into which Bigler or other "good" water is placed, mix, and then discharge without further treatment. The effluent will have an amber appearance, but we have no spec on appearance for our water. This water is recommended for acquisition with the above type of treatment scheme. The table below summarizes the analytical testing.

Southwest Shipyard	
Evaluation 0609-02	
Flash Point, deg F	>140
Solids, vol%	0
Odor	Present but not objectionable
pH	9
Phenols, ppm	0
TOC, mg/L	24,730
Oil, vol%	0
Treatability	Does not treat
Metals, ppm	
Ni	0.000
Zn	3.800
Cu	0.789
Cd	0.012
Cr	0.069

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Camp
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 6/05/09

From: Miles Root

Lab Memo: 09-106

Subject: **Ethyl Evaluation 0609-01**

A sample of crank case additive from Ethyl, via Afton, has been evaluated for potential use at CES. This sample is evaluation 0609-01 and represents approximately 3000 gallons of material for this one-time acquisition. Overall, this material is suitable for black oil blending, and is recommended for acquisition.

This material is medium amber in appearance with a typical slight oil odor. The chlor-d-tect is less than 100 ppm; water is 33 ppm, with an API gravity of 17.4. The color is 5.5, too dark I believe for good base oil. This material mixes well with both black and base oil. It is very viscous so will need heating for best pumpability. There are no other issues with this material and it is recommended for acquisition.

The table below summarizes the analytical testing.

Ethyl	
Evaluation 0609-01	
Chlor-d-tect, ppm	<100
API Gravity	17.4
Water, ppm	33
Color	5.5
Black Oil Blendability	Okay
Base Oil Blendability	2,638
Appearance	Medium Amber

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
CC: Matt Bowman, Prabhaker, Jay Matlock

Date: 6/02/09

From: Miles Root

Lab Memo: 09-105

Subject: **<u>Entergy Lewis Creek Evaluation 0509-52</u>**

A sample of sulfuric acid from Entergy Lewis Creek, Willis, TX, has been evaluated for potential recycle use at PACES. This sample is evaluation 0509-52 and is stated to be a mixture of 2000 gallons of 98% sulfuric acid and 200 gallons of caustic. The potential volume of this stream is approximately 2000 gallons. We can use this material at PACES for neutralization purposes.

This sample is pale green in appearance and has a density of 1.52. Since this acid has some salts from the caustic addition it's impossible to know its exact strength from this gravity, but I'm guessing it's around 60%. I tested this acid on some of our PACES phenolic caustic to see how it reacted. It appears to break out the cresylic acids just fine with no unusual observations noted. I also mixed this acid with some of our CES plant acid just to see any potential reactions. Nothing noted unusual.

Other than the fact that the pale green appearance is a little unusual, this acid will work fine for PACES use. It's acquisition is recommended.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
CC: Matt Bowman, Prabhaker, Clink Hopkins, Sam Brown, Joe Camp

Date: 6/02/09

From: Miles Root

Lab Memo: 09-104

Subject: **Vertex Energy Evaluation 0509-50**

A sample of oil from Vertex Energy has been evaluated for potential processing at CES. This sample is evaluation 0509-50 and is oil that is to be cleaned out of a tank. This is a potential one-time acquisition of two loads of material. I do not know if the two loads also include the wash water or is just the black oil. This oil is loaded up with cresylics so the water from washing this tank will be very high in "phenols" and will need to move to System 1. The oil is okay for processing but requires care when cleaned from the tank initially so that it does not form emulsions.

The oil has a non-typical black oil odor. When extracted on a 1:1 basis with tap water to simulate a tank cleaning, an emulsion can be formed if one is not careful when mixing. I extracted this sample three times before I learned how much not to shake this with water for an extraction. This oil forms an emulsion much too easily, so it has another "non-oil" constituent that is reacting. The resulting water from this simple extraction is loaded up with phenols. I did not try to exactly quantitate the value, but it is in the hundreds of ppm range. This water will need to go to System 1. TOC on this particular water is 5163 ppm, and the metals are all acceptable. The exact values on all of this water will depend upon how it is generated during the tank cleaning phase.

The oil that comes from this tank mixes well with our black oil. It has a 0.4 wt% ash and an API gravity of 26. The chlor-d-tect is only 700 ppm, an acceptable value. Overall, we can process this oil here, but the water will most likely need to be redirected to System 1. The table below summarizes the analytical testing.

Vertex Energy	
Evaluation 0509-50	
API gravity	26
Phenols in oil	100's ppm
TOC, mg/L on extracted water	2242
Odor	Non-typical
Ash, wt%	0.4
Chlor-d-tect, ppm	700
Black Oil Blendability	OK
Metals, ppm - extracted water	
Ni	0.000
Zn	0.002
Cu	0.101
Cd	0.000
Cr	0.009

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman, Jay Matlock, Steve Stricker
CC: Prabhaker, Joe Camp, Jenny Rust, Suzi Mock
From: Miles Root

Date: 6/01/09

Lab Memo: 09-103

Subject: **Calcasieu Sulfidic Caustic**

A sample of sulfidic caustic from Calcasieu has been tested for pricing by CES. I have not seen a sample of this material so cannot address the appearance, as this work was performed at PACES by Suzi Mock.

This sample is very high in carbonates and cannot be used to produce a NaHS product, but is a "direct market" type of stream.

The table below summarizes the analytical testing for this sample.

Calcasieu Sulfidic Caustic	
Specific Gravity	1.14
Total Alkalinity, as NaOH, wt%	13.9
Mercaptan Sulfur, as S, wt%	0
Sulfide Sulfur, as S, wt%	1.23
Carbonate, as Na_2CO_3, wt%	19.7
NaHS, wt%	0
Na_2S, wt%	3

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown, Joe Camp, Jenny Rust

Date: 5/29/09

From: Miles Root

Lab Memo: 09-102

Subject: **Delta Chemical Evaluation 0509-48**

A sample of oil from Delta Chemical, Tidal Rd, has been evaluated for potential receipt/processing/sales by CES. This sample is evaluation 0509-48. This is a one-time potential receipt of approximately 10,000 gallons.

This oil has a typical black oil appearance and odor. A chlor-d-tect shows 800 ppm, an acceptable value. Water in the oil is 0.38%. API gravity is 31. The sample contains a very small amount of water layered on the bottom, less than 1%, and will not be an issue. There are no issues with this material and it is recommended for acquisition to resell or blend.

The table below summarizes the analytical testing.

Delta Chemical	
Evaluation 0509-48	
API Gravity	31
Chlor-d-tect	800
Water %	0.38
Odor	Typical
Blends with black oil	yes

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
CC: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown,
Joe Camp, Jenny Rust

Date: 5/29/09

From: Miles Root

Lab Memo: 09-101

Subject: **Tideport Evaluation 0509-49**

A sample of oil from Tideport, Baytown, has been evaluated for potential receipt/processing/sales by CES. This sample is evaluation 0509-49. This is a one-time potential receipt of one load of oil.

This oil has a caramel colored appearance. The chlor-d-tect is less than 100 ppm. Water content is 5.92%. Upon standing there seems to be a phase separation of some type, but this may just be the water separating out. This oil mixes with typical black oil and does not phase separate out over time. It does have some solids which appear as black specs or small pieces of material. These are difficult to quantitate due to the very viscous nature of this oil, but do not appear to be a significant amount. API is 31 and flash point is greater than 140 deg F. This oil does have a solvent type odor, almost like a burnt odor, but it is only non-typical and not offensive.

We can take this material and blend it with our black oil. Its very viscous nature will require significant blending. The table below summarizes the analytical testing.

Tideport	
Evaluation 0509-41	
API Gravity	31
Chlor-d-tect, ppm	<100
Water, wt%	5.92
Appearance	caramel
Odor	Solvent
Flash Point, deg F	>140
Blends with Black Oil	Yes

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman, Jay Matlock
CC: Prabhaker, Joe Camp, Jenny Rust
From: Miles Root

Date: 5/28/09

Lab Memo: 09-100

Subject: **Citgo, Lemont Sulfidic Caustic Evaluation 0509-41**

A sample of spent sulfidic caustic from Citgo, Lemont, IL has been evaluated for potential marketing by CES. This sample is evaluation 0509-41. The potential volume of this stream is 10,000 gallons per month.

This sample is pale green in appearance and contains only a small amount of very fine particulates. I don't believe that this will be an issue with customers. The sample contains no floating hydrocarbons or any other abnormalities. This is what a customer likes to hear about their caustic. The odor of this material is typical of refinery caustics, which is not pleasant.

Sample has a specific gravity of 1.145, a NaOH value of 12.2 wt%, sulfides of 0.38 wt% and no mercaptans. Sodium carbonate, expressed as sodium carbonate, is 3.2 wt%.

This material looks like a good candidate for material to move to paper mills. It can go to the DeRidder mill since it already meets their specifications, and it has a fairly good caustic strength. The caustic strength is too high for it to be a reasonable feed for NaSH production at PACES.

The table below summarizes the analytical testing for this sample.

Citgo, Lemont IL	
Evaluation 0509-41	
Appearance	Pale Green
Specific Gravity	1.145
Total Alkalinity, as NaOH	12.2
Mercaptan Sulfur, as S, wt%	0
Sulfide Sulfur, as S, wt%	0.38
Carbonate, as Na_2CO_3, wt%	3.2
NaHS, wt%	0
Na_2S, wt%	0.9

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 5/27/09

From: Miles Root

Lab Memo: 09-097

Subject: **Huntsman Evalution 0509-42**

A sample of line flush containing water and "oil" from Huntsman, Conroe, has been evaluated for processing at CES. This sample is evaluation 0509-42. The potential volume of this stream is three loads per day. There are no associated waste codes with this stream. Overall, water from this stream requires extremely high volumes of acid for treatment due to amines, which is a major stumbling block for processing. The high amine water is an issue that will not be readily or easily resolved by any type of processing at CES. The "oil" can be blended with light ends or sold "as is" for its BTU value. Since System 1 is not an outlet for the water, I recommend that we not take this stream.

This two phased sample contains water and "oil". The water phase is said to contain some ammonia and water soluble amines. The "oil" contains IPA in trace amounts, acetone, polyols and amines. The "oil" phase is approximately 33% of the sample that I evaluated. The entire sample has a strong odor of ammonia and amines.

The "oil" does not mix with black oil, mixes with light ends, and has a BTU value of 11,222. It is light tan in color with a strong ammonia odor. It may be sold for its BTU value "as is". This stream will not need to be acid/heat treated to recover the "oil", as it will phase separate out over a fairly short amount of time, a matter of minutes in the laboratory. The ammonia odor in the "oil" is not high enough to give it a flash point below 140 deg F.

The water phase contains approximately 150 ppm as ammonia and when treated around 30 ppm as ammonia, using a field test type of analysis. Besides the ammonia, the amines in this water are an issue. This water requires an extremely high volume of sulfuric acid to reduce the pH to 4. This sample will require an approximate 25% volume addition of our current use plant sulfuric acid to reduce the water to a pH of around 4, and 30% by volume addition to a pH of 3, our typical end point. The treated water does form a higher than normal amount of solids, but they do settle out over time, leaving a clear brownish water. The ammonia odor is very strong in the treated water. High ammonia and amines in water will be an issue with the City of Houston "bugs" that are used in their water treatment system.

Metals on the treated water are high in nickel at 5 ppm. This metal must be in a complex state in order for it to not react with the lime. The other metals are at acceptable levels. TOC is on the high side at 26,930 ppm and there are no phenols.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

The main issue with this stream is the ammonia and amines. The fact that these amines smell like ammonia indicates that they are methyl and ethyl amines, as the higher alkyamines have a fishy odor. As a result they are very soluble in water, form hydrogen bonds with water, but have lower boiling points than their respective alcohols. They will not economically be distilled away

Primary amines such as these can be oxidized to their respective nitriles with the use of a catalyst (2,2,6,6-Tetramethylpiperidinyloxy, known as TEMPO) and trichloroisocyanuric acid, our bleach substitute, but even this yield is only 80-90% complete, and is beyond the current scope of operation at CES.

Primary amines can also be converted into amides using an acid chloride, but again, this is a rather "reactively violent" reaction, and beyond the scope of operations at CES.

Without an outlet for this high ammonia/amine water, processing this stream is not recommended at CES.

The table below summarizes the analytical testing.

Huntsman	
Evaluation 0509-42	
Flash Point, deg F	>140
Solids, vol%	0
Odor	Very strong ammonia odor
pH	11
Phenols, ppm	0
TOC, mg/L	26,930
Oil, vol%	33
Oil BTU	11,222
Treatability	Very difficult
Metals, ppm	
Ni	5.236
Zn	0.524
Cu	0.427
Cd	0.143
Cr	0.067

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 5/27/09

From: Miles Root

Lab Memo: 09-099

Subject: **Future Environmental Evaluations 0509-44 & 45**

Two samples of oily bilge water from Future Environmental have been evaluated for potential processing at CES. These samples are evaluations 0509-44 and 45. They are both oily bilge water with one-time volumes of 8500 gallons each. Both streams are acceptable for processing at CES.

Evaluation 0509-44 will need heat and acid treatment as it is an emulsion. The sample breaks out readily with our heat/acid treat, leaving a clear water phase. The water treats easily and without issues. This treated water has no phenols, TOC of 9462 ppm and acceptable metals. The oil has a chlor-d-tect of only 200 ppm. There are no odor issues with this material. Pricing for this stream should be at least $0.15/gal to cover our treatment costs.

Evaluation 0509-45 is not an emulsion, with a distinct separation between the water and oil phases. The water treats easily and without issues. The treated water has no phenols, TOC of 1008 ppm and acceptable metals. The oil has a chlor-d-tect of only 200 ppm. There are no odor issues with this material. Pricing for this stream should be at least $0.12/gal.

The table below summarizes the analytical testing for both of these streams.

Future Environmental Evaluations 0509-44 & 45		
	0509-44	0509-45
Emulsion	yes	no
Odor	OK	OK
pH	7	7
Phenols, ppm	0	0
TOC, mg/L	9462	1008
Oil, vol%	17	24
Chlor-d-tect, ppm	200	200
Solids in water, vol%	0	0
Treatability	OK	OK
Metals, ppm		
Ni	0.033	0.042
Zn	0.0445	0.138
Cu	0.054	0.029
Cd	0.007	0.004
Cr	0.000	0.000

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 5/26/09

From: Miles Root

Lab Memo: 09-098

Subject: **Intra Services Evalution 0509-43**

A sample of line flush water from Intra Services has been evaluated for potential processing at CES. This sample is evaluation 0509-43. The potential volume of this stream is 40,000 gallons as a one-time acquisition. Overall, this water looks good for processing at CES and should present no issues in its treatment. It is recommended for acquisition.

This water does not need our standard treatment. The neat water has a pH of 7, no phenols, and very low metals. Its TOC is only 933 ppm. The water is free of odor and water white in appearance. There are some very minor solids that quickly settle out that appear to be scale or rust. These are in trace amounts and are not an issue. There are no oils. This water may be used for equalization purposes or discharged without our standard water treatment scheme. This water is recommended for acquisition and processing at CES.

This water may be treated if it is needed to be used as equalization water. It treats easily and forms a nice floc. There are no issues in its use in this manner.

The table below summarizes the analytical testing.

Intra Services	
Evaluation 0509-43	
pH	7
Phenols, ppm	0
TOC, mg/L	933
Odor	None
Oil, vol%	0
Treatability	None Required
Metals, ppm	
Ni	0.009
Zn	0.000
Cu	0.000
Cd	0.000
Cr	0.176

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman, Jay Matlock
Cc: Prabhaker, Clint Hopkins, Sam Brown

Date: 5/22/09

From: Miles Root

Lab Memo: 09-096

Subject: **Quality Assured Plating Evalution 0509-40**

A sample of spent caustic from Quality Assured Plating has been checked for percent caustic. We have 2200 gallons in eight totes on hand of this material. Sample is bi-layered, with caustic on top and caustic metal sludge on bottom. Caustic value of top phase is 4.4 wt% by titration. This is a good match to the density of 1.048, which equates to a 4.3 wt% NaOH in a fresh caustic water mix. Sample obviously is loaded up with carbonates as indicated by the excessive foaming upon acidification.

This will not add any value to PACES, but that is our only viable option for this caustic. This very low caustic strength will spend out very quickly when used as a NaHS product.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Matt Bowman, Clint Hopkins, Prabhaker, Sam Brown

Date: 5/20/09

From: Miles Root

Lab Memo: 09-095

Subject: **Zach Evaluation 0509-35**

A sample of solids from Zach has been checked for reactivity with water, caustic and acid. This sample is evaluation 0509-35. It is a solid in pelletized form. The chemical name for this material is N-[(S)-1-Etoxycarbonyl–3-phenylpropyl]-L-alanyl N-carboxyanhydride, otherwise known as SCA-NCA. Some research on this compound indicates that this chemical is used in the pharmaceutical industry as an intermediate ingredient used for producing other compounds.

This material is not reactive in water, nor is it even soluble in water. It is completely soluble in sulfuric acid. I used an approximate 50% concentration of sulfuric acid for my testing. While soluble, it is not violent, but simply dissolves in solution. Strong caustic solutions turn this material into a paste like substance, but again, not violent or really reactive. None of the above mixtures with water, acid or caustic would be considered hazardous or violent. The main issue addressed on the MSDS is due to inhalation or contact with the dust from this material.

No other testing was requested. This sample will be retained in our system for any further use.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman
Cc: Clint Hopkins, Prabhaker, Sam Brown

Date: 5/20/09

From: Miles Root

Lab Memo: 09-094

Subject: **<u>Kinder Morgan Evaluation 0509-30</u>**

A sample of waste water and solids from Kinder Morgan has been evaluated for potential processing at CES. This sample is evaluation 0509-30. This sample represents material in a frac tank that is a potential single load receipt. Overall, we can process this material and should pursue its acquisition.

This sample is basically from a tank cleaning operation. The solids are dirt, rust and scale with a little bit of organics. The solids in the sample were over 50%. The water contains a small quantity of hydrocarbons, but less than 1%. This small amount of hydrocarbons gives this water a flash point of 105 deg F. The pH is 7.

This water can be sucked out of the frac tank and heat treated, which will release the small amount of hydrocarbons it contains. This organic material can go into light ends or even oil, as it will be a very small quantity.

The resulting heat treated water can then be treated using our standard water treatment. Excessive solids are formed upon the addition of lime, but the water does treat out okay. The resulting water has no phenols and low metals. The solids that remain in the sludge box will need to be tested for benzene as this chemical is suspect in this type of stream.

We should be able to handle this stream and its acquisition is recommended. The table below summarizes the analytical testing.

Kinder Morgan	
Evaluation 0509-30	
pH	7
Phenols, ppm	0
TOC, mg/L	1768
Odor	Hydrocarbon
Flash Point, deg F	105
Oil, vol%	1
Treatability	OK
Metals, ppm	
Ni	0.000
Zn	0.094
Cu	0.129
Cd	0.004
Cr	0.048

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Matt Bowman, Clint Hopkins, Prabhaker, Sam Brown

Date: 5/19/09

From: Miles Root

Lab Memo: 09-093

Subject: **Sierra Chemical Evaluations 0509-18 thru 21**

Four different samples of waste material from Sierra Chemical (Cameron Compression), have been evaluated for potential processing/use at CES/PACES. These four samples are evaluations 0509-18 thru 21. A summary of each sample follows.

Evaluation 0509-18 is a spent sulfuric acid. The potential volume is one load every two months. This sample has a density of 1.370. An addition of 50% NaOH to neutralize this acid shows it to be just under 50%. These two pieces of data indicate that this acid is around 47% wt% sulfuric acid.

It is clean looking material which springs out crude cresylic acid or liberates hydrogen sulfide from spent caustics. I treated this sample as water just to see how it would process. Of course it requires an excessive amount of caustic for it to be neutralized, but the water produced is good looking with low metals. Since it will add value to our business as an acid we should use it in that capacity. I recommend that we try this acid at PACES in either our cresylic acid or NaSH production process.

Evaluation 0509-19 is some type of spent caustic. The potential volume of this material is one load per quarter. This sample has a density of 1.147, which should equate to 15% caustic. A titration shows this caustic to be 8.8 wt% as NaOH, but it does contain a significant amount of sodium carbonate as well. Its high carbonate content is indicated by the excessive foaming noted during the titration with HCl. Sodium carbonate will not be a part of any reaction for strengthening our NaSH production, and will actually lower the sulfide component. Currently we get no compensation for the carbonates in our NaSH product.

The strength of usable caustic is too low for profitable use at PACES. Metals on the neat sample show very high zinc and chromium. If we can make some good money for taking this material then it needs to go to PACES. We can put it into the NaSH product tank to consume the small amount of hydrogen sulfide that it will do. It will not make us any money on the NaSH sales side so we need to cover our costs up front. I don't see a better option if we really want to take this material.

Evaluation 0509-20 is waste water. The potential volume is three loads per month. This water has a pH of 6 and contains orange/brown silt from its previous use. When treated, it produces an extremely high volume of solids which I estimate to be at least 75% when spun down. Metals and TOC are low, with no phenols. Odor is not an issue. We can treat this water at CES but need to price as though we are going to filter press this entire load, as that may happen.

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Evaluation 0509-21 is an unknown cleaning solution. It is called CL 2000 spent acid. The potential volume of this material is four totes per quarter. It has a pH of around 3 but does not act like it has much acid strength left in it. When reacted with sulfidic caustic its reaction causes only a trace quantity of hydrogen sulfide to be released. It also forms an emulsion looking product that will need to be disposed. Odor is not really an issue with this stream.

This material contains a soap or detergent as it foams when shaken, and the foam remains for quite some time afterwards. This material does not really treat. It forms a sludge when mixed with caustic and/or lime that never separates out into anything that can be processed. Metals on the neat sample are extremely high in zinc and chromium.

This is not an acid that will add value to CES or PACES, nor does it respond to waste water treatment. Since it is only four totes per quarter our only logical processing scheme is to bring it into CES and slowly process it over time into our tanks. The volume of sludge that is produced will evenly distribute itself out over thousands of gallons of water. These four totes will all end up in our filter cake box over time. If our pricing will be high enough to cover this considerable amount of extra handling that will be involved and we can make some good money, then this is an option we should seriously consider.

The table below summarizes the analytical data and recommendations on the above samples.

Sierra Chemicals				
Evaluations 0509-18 thru 21				
	0509-18	0509-19	0509-20	0509-21
H2SO4, wt%	47			
NaOH, wt%		8.8		
Specific Gravity	1.137	1.147		
CES Use	No	No	Yes	Yes
PACES Use	Yes	Yes	No	No
Odor Issues	None	None	None	None
Treatability	Use @ PACES	N/A	Difficult	Very Difficult
Phenols, ppm			0	0
Metals			Treated Sx	Untreated Sx
Ni			0.11	71
Zn			0.022	2.432
Cu			0.032	0.558
Cd			0.01	0.146
Cr			0	174
Recommended?	Yes	Yes	Yes	Yes

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Matt Bowman, Clint Hopkins, Prabhaker, Sam Brown

Date: 5/18/09

From: Miles Root

Lab Memo: 09-092

Subject: **Port of Galveston Evaluation 0509-29**

A sample of waste water from the Port of Galveston has been evaluated for processing at CES. This sample is evaluation 0509-29. This material is wash water used for paint removal. I assume it is from some type of power washing done to remove paint. This is a probable one-time volume of something less than 20,000 gallons. This water looks acceptable for processing at CES and is recommended for acquisition. Its best use will be as an equalization water.

This water is clean looking with no evidence of paint. It has a very slight odor that is not unpleasant. This water has a pH of 6.5 and no phenols. It has very low metals and a TOC of 600 ppm. This clean looking water can be treated easily but there is no reason to do so. Unless the actual water looks very different from the evaluation sample, this water needs no treatment in order for it to be discharged. We can use this water as part of our equalization water without issues. Its acquisition is recommended.

The table below summarizes the analytical testing.

Port of Houston	
Evaluation 0509-29	
pH	6.5
Phenols, ppm	0
TOC, mg/L	600
Odor	OK
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	0.021
Zn	0.000
Cu	0.165
Cd	0.000
Cr	0.000

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Matt Bowman, Clint Hopkins, Prabhaker, Sam Brown

Date: 5/18/09

From: Miles Root

Lab Memo: 09-091

Subject: **Crown Cork & Seal Evaluation 0509-28**

A sample of oily water from Crown Cork & Seal has been evaluated for processing at CES. This sample is evaluation 0509-28. It is oily water from a process of making aluminum cans. The potential volume of this material is 1-2 loads per month. Overall, we can process this oily water with our standard heat and acid treatment and recover the water for processing.

This sample is an oily emulsion with an unpleasant odor. It has a pH of 7. This sample must be heated for the oil to properly break out. A small amount of acid quickens this process. The oil does not have the appearance of black oil but is more like an oily rag layer. Oil recovery on this sample is 1%.

The broken out water treats easily and forms a nice floc. The treated water has 2 ppm phenols, acceptable metals and low TOC. I do not know of any aluminum specs we have for our discharge water and we do not currently have a lamp to test for aluminum should it be an issue.

Overall this water should present no particular issues in its treatment. The table below summarizes the analytical testing.

Crown Cork & Seal	
Evaluation 0509-28	
pH	7
Phenols, ppm	2
TOC, mg/L	2460
Odor	Unpleasant
Oil, vol%	1
Treatability	OK
Metals, ppm	
Ni	0.211
Zn	0.000
Cu	0.169
Cd	0.000
Cr	0.000

Mercury Environmental Services, Inc.

6913 HWY 225, Deer Park, TX 77536
Phone: (281)-476-4534 Fax: (281)-476-4406

CES Environmental Services
4904 Griggs Rd
Houston, TX 77021

Phone: (713) 676-1460
Fax: (713) 676-1676

Attn: **Miles Root**

- CERTIFICATE OF RESULTS -

MES Lab#: 9050237

Client Sample ID: 0509-27 Filter Cake
Extended ID: CES Sample #0509-27

Sample Type: Grab

Sample Receipt Date: 5/18/2009 @ 11:15:00 AM

Test Group / Method

Total Petroleum Hydrocarbons Solid Method: TNRCC 1005	MDL	Result	Units	Analyst: HDG Date / Time
C6 - C12 Hydrocarbons	4	**2670**	**mg/kg**	5/22/2009 / 3:53 PM
>C12 - C28 Hydrocarbons	8	**8960**	**mg/kg**	5/22/2009 / 3:53 PM
>C28 - C36 Hydrocarbons	8	**2800**	**mg/kg**	5/22/2009 / 3:53 PM
Total TPH	20	**14400**	**mg/kg**	5/22/2009 / 3:53 PM

TCLP Metals (11) Method: SW-846 6010B	MDL	RL	Result	Units	Analyst: JCA Date / Time
Antimony	0.032	1	< 0.032	mg/L	5/19/2009 / 5:24 PM
Arsenic	0.014	5	< 0.014	mg/L	5/19/2009 / 5:24 PM
Barium	0.0005	100	**0.0490**	**mg/L**	5/19/2009 / 5:24 PM
Beryllium	0.0005	0.08	< 0.0005	mg/L	5/19/2009 / 5:24 PM
Cadmium	0.002	1	< 0.002	mg/L	5/19/2009 / 5:24 PM
Chromium	0.002	5	< 0.002	mg/L	5/19/2009 / 5:24 PM
Lead	0.005	5	< 0.005	mg/L	5/19/2009 / 5:24 PM
Nickel	0.003	70	< 0.003	mg/L	5/19/2009 / 5:24 PM
Selenium	0.024	1	< 0.024	mg/L	5/19/2009 / 5:24 PM
Silver	0.002	5	< 0.002	mg/L	5/19/2009 / 5:24 PM

TCLP Mercury Method: SW-846 7470A	MDL	RL	Result	Units	Analyst: JCA Date / Time
Mercury	0.0002	0.2	**0.0004**	**mg/L**	5/19/2009 / 5:00 PM

Flags: H: Exceeds "High Limit" L: Below "Low Limit" RL=regulatory limit

John Keller

John Keller, Ph.D., Lab Director

Tuesday, May 26, 2009
Date

Report Date: *26-May-09*

SAMPLE: 9050237 DATE: May 26, 2009

MERCURY ENVIRON LABS
QA/QC REPORT

ANALYTES	METHOD TPH 1005	MB mg/kg	CCV %REC	MS %REC	MSD %REC	RPD
C6-C12		<4	113	93	97	4
C12-C28		<8	98	96	101	5

ANALYTE	MB mg/L	LCS %REC	LCSD %REC	RPD	CCB mg/L	CCV %REC
Antimony	< 0.032	88	92	4	< 0.032	98
Arsenic	< 0.014	88	94	6	< 0.014	96
Barium	< 0.002	90	94	4	< 0.002	98
Beryllium	< 0.002	92	98	6	< 0.002	99
Cadmium	< 0.002	92	98	6	< 0.002	98
Chromium	< 0.001	101	94	7	< 0.001	99
Lead	< 0.005	88	92	5	< 0.005	98
Mercury	< 0.0002	100	100	0	< 0.0002	100
Nickel	< 0.003	90	96	6	< 0.003	97
Selenium	< 0.024	88	92	4	< 0.024	97
Silver	< 0.002	90	94	4	< 0.002	95

Key to QA Abbreviations

MS=Matrix Spike
RPD=Relative Percent Deviation
LCS=Laboratory Control Standard
CCB=Continuing Calibration Blank
MDL=Minimum Detection Limit
MSD=Matrix Spike Duplicate
MB=Method Blank
CCV=Continuing Calibration Verification
%Rec=Percent Recovery
RL=Regulatory Limit

Signature: John Keller

John Keller, Ph.D. / Laboratory Director

CES Environmental Services, Inc.

TESTING LABORATORY IDENTIFICATION & INFORMATION:
MES

CHAIN of CUSTODY RECORD

CES Environmental Services, Inc.
4904 Griggs Road
Houston, TX 77021
Main Number: (713) 676-1460
Fax Number: (713) 676-1676

Test Results Reporting

CES Environmental Services, Inc.
Main Number: (713) 676-1460
Fax Number: (713) 676-1676

Project Name	Sample Name	Comments/Special Instructions:
	0509-27 FILTER CAKE	**Turnaround Time Required:**
Contact: MILES ROOT 832-607-6678		DATE and/or Number of Days: 1 WEEK
SAMPLER: PRINT: MILES ROOT SIGN: Mile Root		**OTHER INFORMATION:**
Type and Number of Containers (CIRCLE): Glass 1 2 3 Grab 4 5 6 Other: PLASTIC		SAMPLE NAME/ID ('s): FILTER CAKE **CES Sample LOG BK Number ('s):** 0509-27
Requested Analysis: TCLP METALS - RCRA 8 + 3 TPH		☐ ☐

1. Relinquished By:	Date:	Time:	2. Received By:	Date:	Time:
Mile Root	5/18/09	8:25A		5/18/09	8:26 A.
3. Relinquished By:	**Date:**	**Time:**	**4. Received By:**	**Date:**	**Time:**
	5/18/09	11:15A	John Keller	5/18/09	11:15
5. Relinquished By:	**Date:**	**Time:**	**6. Received By:**	**Date:**	**Time:**

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Matt Bowman, Clint Hopkins, Prabhaker, Sam Brown

Date: 5/18/09

From: Miles Root

Lab Memo: 09-090

Subject: **Phoenix Pollution Control Evaluation 0509-26**

A sample of caustic from Phoenix Pollution Control has been evaluated for potential use at CES. This sample is evaluation 0509-26 and is a sample of unused caustic which was previously used in a waste water treatment plant. This is a one-time acquisition of approximately 1000 gallons, and its acquisition is recommended.

This material is near water white in appearance with what appears to be rust and dirt that settles out to the bottom. Its density is 1.261, which equates to approximately 24% caustic, as NaOH. By titration this material is 24.7 wt% as NaOH.

The caustic has high copper at almost 6 ppm while zinc is at 2 ppm. We should still be able to handle this caustic. The metals were tested on an untreated sample and lime addition will reduce these metals down. Also, caustic will not be added in any quantity large enough to make these metals an issue. This material has typical caustic odor and looks good for caustic use at CES. Its acquisition is recommended.

The table below summarizes the analytical testing.

Phoenix Pollution Control	
Evaluation 0509-26	
Density	1.261
NaOH, wt%	24.7
Odor	Typical
Metals, ppm	
Ni	0.552
Zn	2.108
Cu	5.868
Cd	0.246
Cr	0.000

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Clint Hopkins, Prabhaker, Sam Brown

Date: 5/15/09

From: Miles Root

Lab Memo: 09-089

Subject: **Cliff Berry, Inc Evaluation 0509-17**

A sample of waste water from Cliff Berry, Inc., Boling, TX has been evaluated for potential processing at CES. This sample is evaluation 0509-17 and is a sample of purge waste water. This is a one-time potential of approximately 10,000 gallons. Overall, this is good looking water that we can easily handle, and is recommended for acquisition and process at CES.

This is clean looking water with only a slight but acceptable odor and has a pH of 7. The water has a trace of solids that looks like rust and dirt. The water treats easily and forms a nice large floc which quickly phase separates. The treated water has no phenols, low TOC and metals. This water is recommended for processing and should present no problems.

The table below summarizes the analytical testing.

Cliff Berry, Inc.	
Evaluation 0509-17	
pH	7
Phenols, ppm	0
TOC, mg/L	468
Odor	Acceptable
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	0.124
Zn	0.014
Cu	0.101
Cd	0.027
Cr	0.002

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman
Cc: Clint Hopkins, Prabhaker, Sam Brown, Joe Camp

Date: 5/14/09

From: Miles Root

Lab Memo: 09-088a

Subject: **KMCO Evaluation 0509-13**

A sample of HiTech 312 from KMCO, generated by Afton Chemicals, has been evaluated for potential use at CES. This sample is evaluation 0509-13 and is excess, on-spec material produced from a campaign run. Potential volume is 20,000 lbs, or around 2100 gallons. Overall, this material needs to be marketed "as is" into the finished oil blenders market, where it will have its best value.

HiTec 312 is an oil additive and a sulfurized olefin product, also known as an alky sulfide. Alky sulfides are used in the oil additives industry to help reduce engine wear. They are sold into the oil blenders markets and added to oils in very small percentages, which helps to explain why this material is not totally miscible with black oil at a 1:1 blend ratio.

This material is clear yellow in appearance with a very pungent odor. The data sheet with this material indicates its flash point as 176 deg F and viscosity in cSt as 59 and 8 @ 40 and 100 deg C respectively. This sample has 228 ppm water, specific gravity of 1.135 and no ash. The BTU/lb value is 11,425, which is not exceptionally high to move it to a fuels market. Black oil is only partly miscible with this sample. When mixed in a 1:1 ratio it initially appears to blend well but is somewhat separated by centrifuge. Mixing with our black oil for sales is not recommended.

Again, this material is best marketed to a finished oil blender, where we will get our best value. The table below summarizes the analytical testing.

KMCO	
Evaluation 0509-13	
Specific gravity	1.135
Water, ppm	228
Ash, wt%	0.00
BTU/lb	11,425
Black Oil Compatibility	Not Recommended
Odor	Pungent

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman
Cc: Clint Hopkins, Prabhaker, Sam Brown, Joe Camp

Date: 5/12/09

From: Miles Root

Lab Memo: 09-088

Subject: **KMCO Evaluation 0509-13**

A sample of HiTech 312 from KMCO, generated by Afton Chemicals, has been evaluated for potential use at CES. This sample is evaluation 0509-13 and is excess, on-spec material produced from a campaign run. Potential volume is 20,000 lbs, or around 2100 gallons. Overall, this material needs to be marketed "as is" into the finished oil blenders market, where it will have its best value.

HiTec 312 is an oil additive and a sulfurized olefin product, also known as an alky sulfide. Alky sulfides are used in the oil additives industry to help reduce engine wear. They are sold into the oil blenders markets and added to oils in very small percentages, which helps to explain why this material is not totally miscible with black oil at a 1:1 blend ratio.

This material is clear yellow in appearance with a very pungent odor. The data sheet with this material indicates its flash point as 176 deg F and viscosity in cSt as 59 and 8 @ 40 and 100 deg C respectively. This sample has 228 ppm water and a specific gravity of 1.135. The BTU/lb value is 11,425, which is not exceptionally high to move it to a fuels market. Black oil is only partly miscible with this sample. When mixed in a 1:1 ratio it initially appears to blend well but is somewhat separated by centrifuge. Mixing with our black oil for sales is not recommended.

Again, this material is best marketed to a finished oil blender, where we will get our best value.

9. Physical and Chemical Properties

Physical State and Appearance : Liquid. (Clear.)
Color : Yellow. to Amber.
Odor : Pungent.
Vapor Pressure : 0.52 mm Hg at 50°C.
Specific Gravity : 1.135 at 15.6°C (target).
Viscosity : 59 cSt @ 40°C (typical)
8 cSt at 100°C (target).
Flash Point : Closed cup: 80°C (176°F). (Pensky-Martens. Minimum)

10. Stability and Reactivity

Stability : The product is stable.
Materials to avoid : Strong oxidizing and reducing agents.
Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological Information

Routes of Entry : Skin, Eyes, Ingestion, and Inhalation.
Target Organs : None known.

Acute Effects
Inhalation : Non-irritating to the respiratory system.
Ingestion : Not determined.
Skin Contact : Non-irritating to the skin.
Eye Contact : Non-irritating to the eyes.

Chronic Effects
Adverse Effects : Not determined.
Carcinogenic Effects : Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity Data

Ingredient Name	Test	Result	Route	Species
Not determined.				

Other information : Not available.

12. Ecological Information

Environmental Hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
Environmental Fate : This product contains components which may be persistent in the environment.
Germany water class : 1

13. Disposal Consideration

Waste Handling and Disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport Information

Regulatory information	UN number	Proper shipping name	Class	Packing Group	Label	Additional information
DOT Classification	NA1993	Combustible liquids, n.o.s. (sulfurized olefins)	Combustible liquid.	III		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class		-	-	-		-

EPAHO113001104

[redacted] HITEC 312 Raw Material Spec [redacted]

Raw Material Name: SULFURIZED OLEFIN .. Raw Material

[redacted] HITEC 312 CMCS Code:

[redacted] Product

Version:

[redacted]

Supplier Notes:
Shelf life recommendation, 24 months at ambient, 10-40C ambient, 10-40C
formely Ethyl
Corp

General Description and Purpose:
[redacted]

Specific Gravity: N/A
Viscosity@40C: N/A
Viscosity@100C: N/A

Certificate of Analysis Specifications:

Limits

Test	Units	Methods	Min	Typ	Max
Specific Gravity @15.6/15.6 C	Sp Gr	D4052	1.125		1.145
Flash Pt C (PMCC)	C	D93 Mod	80		
Viscosity @ 100C	cSt	D445	7.0		8.9
Sulfur	%M	D1552	45.5		49.5
Chlorine	%M	D4929B Mod			0.25
Water	%M	D6304 (mod)			0.15
CCT	mg	EC-150C	25		75
Color, Neat	ASTM	D1500 Mod			4
1 Appearance	visual	EC-112A			

BS&W Vol% D2273 Mod
0.05

(1) Clear Bright Yellow to Amber Liquid

C of A Notes:
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(1) A Certificate of Analysis is required on the product as delivered and must include a date from which the recommended shelf life of the product can be assessed. When it is within the supplier capability, methods used shall be indicated on Certificates of Analysis.

(2) All the above tests to be carried out by the supplier.

(3) All product supplied according to this specification must meet the stated quality limits, tested by the methods quoted above. These test methods shall be followed exactly as written, unless deviations are declared to and accepted by EM Synthetics. Alternative methods may also be used only with prior agreement of EM Synthetics.

Other Characteristics Notes:
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(1) Other Characteristics are defined as characteristics which are expected to be met for every batch of product, but which are not expected to be tested or reported for every batch which is produced or delivered.

Handling and Storage Instructions, Including Temperatures:

Maximum Blending Temperature: 65C
Maximum Storage Temperature: 35C
Maximum Handling Temperature: 50C
Shelf Life Recommendations: 24 MONTH

Handling and Storage Notes:
Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. To Avoid fire, minimize ingnition sources.
Keep container in a cool well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame)

FDA Regulations: N/A

USDA Category: N/A
Authorization Date: N/A

Any modification in raw materials, manufacturing sources and/or Processes must be reported and mutually agreed as causing no detrimental Impact on the raw material's performance. Any changes to the limits given in the specification must be notified and a new specification, and safety data sheet, must be notified to ExxonMobil Procurement, and agreed by ExxonMobil before any despatch of the modified product.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Jay Matlock

Date: 5/08/09

From: Miles Root

Lab Memo: 09-087

Subject: **NCRA Caustic Evaluations 0409-16 & 19**

Two samples of caustic from NCRA, McPherson, KS have been evaluated for potential processing/marketing by PACES. These samples are evaluations 0409-16 and 19. Both samples show promise and we should pursue looking at both streams that produce theses materials.

Evaluations 0409-16 is a cresylic caustic. The caustic strength that NCRA is using is fairly high but we can handle this. I checked the sulfides qualitatively with lead acetate paper and it is only present in trace amounts. A sprung sample shows it to have a wet crude content of 7.8 wt%. We are not set up to perform the other extensive testing that could be performed on this sprung acid at this time, nor did the sample size allow for further testing to be performed. A 7.8 wt% crude acid is good enough to at least consider this as a feed in our cresylic acid business. If we want to seriously pursue this supplier then a gallon of this material is needed so that additional testing may be performed. The volume potential of this stream is unknown at this time.

Evaluation 0409-19 is a sulfidic caustic. The NaOH wt% is 14.9. Material has 1.9 wt% sulfides and 4.4 wt% as Na_2CO_3. This may possibly go directly into our sulfide market without any processing. It has a good caustic value. I have not seen specifications for our customers in our sulfidic caustic business, but this should fit into some niche. If nothing else, it can go into green liquor makeup in a paper mill. The potential volume of this stream is unknown at this time.

NCRA McPherson		
Evaluations 0409-16 & 19		
	0409-16	0409-19
Wet Crude, wt%	7.8	
Specific Gravity	1.190	1.160
NaOH, wt%	16.4	14.9
Sulfides, as S, wt%	trace	1.9
Na_2CO_3, wt%	unknown	4.4

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman
Cc: Prabhaker, Clint Hopkins, Sam Brown, Jay Matlock

Date: 5/07/09

From: Miles Root

Lab Memo: 09-086

Subject: **Exxon Baton Rouge Naphthenic Caustic Evaluations 0409-15**

Three samples of naphthenic caustic from Exxon, Baton Rouge, have been acidified to see their potential value for our PACES site. These three samples are labeled No.2, 12 and 16 Unit Spent Caustic from L.O.F.U.

Only portions of a quart bottle were received for testing of each of these streams, which is not enough material to recover the needed sample volumes to perform proper additional testing. Accurately weighed portion from each source were sprung out to a pH of around 3 to recover all available nap acids, which was then accurately weighed. The samples were allowed to sit to phase separate out all possible brine. This wet crude portion is what is needed for additional testing but naphthenic caustic typically contains very small amounts of recoverable acid, so large sample volumes are needed.

The wet crudes summarized below from each source indicate that there is a potential to recover nap acid from each of these streams. Additional one gallon samples of material are requested from each stream in order to better quantify the quality of material we can expect to recover from each source.

Exxon Baton Rouge			
	Evaluation 0409-15		
	No. 2 Unit	No. 12 Unit	No. 16 Unit
Wet Crude Nap Acid, wt%	2.7	3.1	4

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 5/07/09

From: Miles Root

Lab Memo: 09-085

Subject: **Hydrochem Evaluation 0509-08**

A sample of waste water from Hydrochem, Deer Park, has been evaluated for potential processing at CES. This sample is evaluation 0509-08. This water is from rain water in open drums along with some sodium carbonate from bags that may have dissolved into the water as well. The potential volume of this material is not exactly known but is probably a few hundred gallons. Overall, material such as this may be processed at CES, and its acquisition is recommended.

These samples were collected from open top drums to obtain the rain water and from a prepared sample of the solid sodium carbonate that had been mixed into water. I mixed some of the prepared carbonate water into the rain water just to get a feel of what the end result may be like. The actual test sample is therefore a best guess as to what we will receive.

The water will have a pH of from 9-10. When treated, the carbonate present will foam as the carbon dioxide is released. Just how much foaming occurs will depend upon its exact carbonate content. We should be able to handle this in our regular treatment tanks, especially since this will be only a few hundred gallons of material.

The treated water contains no phenols, low TOC and low metals. We will have no issues with this water other than potential foaming, which should be minimal once this water is equalized with other water in its actual treatment. The table below summarizes the analytical testing.

Hydrochem	
Evaluation 0509-078	
pH	10
Phenols, ppm	0
TOC, mg/L	2242
Odor	Acceptable
Flash Point, deg F	>140
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	0.050
Zn	0.055
Cu	0.085
Cd	0.021
Cr	0.001

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 5/06/09

From: Miles Root

Lab Memo: 09-084

Subject: **BJ Services Evaluation 0509-07**

A sample of coolant and mop water from BJ Services has been evaluated for potential processing at CES. This sample is evaluation 0509-07 and represents around one half tote of coolant and mop water. Overall, we can process this small volume of water, even though it is somewhat high in nickel.

The water has a pH of 4.5. It is a pale green colored emulsion that tests to contain approximately 1% ethylene glycol. The water has an unpleasant odor but is not overly offensive, even though odor is subjective. The sample contains approximately 4% solids as determined by centrifuge and a trace of what initially appears to be oil. The addition of heat and acid does nothing to break out the emulsion. A standard treat results in clear but slightly amber colored water that continues to show approximately 1% ethylene glycol. The treated sample does not contain any oil sheen. The TOC on this water is only 441 ppm with no phenols. The nickel content of the treated water is high at 6.5 ppm, with the remaining metals at acceptable levels.

This small volume of water can be used in our equalization process to reduce the nickel content. It is recommended that we pursue its acquisition for CES processing. The table below summarizes the analytical testing.

BJ Services	
Evaluation 0509-07	
pH	4.5
Ethylene glycol	1%
Phenols, ppm	0
TOC, mg/L	441
Emulsion	Yes
Oil, vol%	trace
Treatability	OK
Metals, ppm	
Ni	6.475
Zn	2.068
Cu	0.071
Cd	0.000
Cr	0.000

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman, Jay Matlock
Cc: Matt Bowman, Prabhaker, Clint Hopkins, Sam Brown

Date: 5/04/09

From: Miles Root

Lab Memo: 09-083

Subject: **PCI Evaluations 0509-04-05**

Two samples from PCI have been evaluated for potential feedstock materials for PACES. These samples are evaluations 0509-04 and 05. The volume of each stream is unknown at this time.

Evaluation 0509-04 is sulfalone, a cyclic organo sulfur compound. Its IUPAC name is thiolane 1,1 dioxide. From its formula of $C_4H_8O_2S$, it is 26.6% sulfur by weight. This material is water soluble and not miscible with either oil or light ends products. It is pale amber in appearance. It has a density of 1.252 and a BTU value of 8311. This material is not a great fuel due to its low BTU value. It will not produce hydrogen sulfide upon acidification. Since it is water soluble it may work for PEAK sales.

Evaluation 0509-05 is caustic. It analyzes to be 51% NaOH by weight by titration. Its density is 1.518. This is good looking material with a slight cloudy appearance and typical caustic odor. We can potentially use this material at PACES in our NaSH production.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Prabhaker, Clint Hopkins

Date: 4/28/09

From: Miles Root

Lab Memo: 09-082

Subject: **Gulbrandsen Technologies Evaluations 0409-30-31**

Two samples of waste water containing aluminum chlorhydrate from Gulbrandsen Technologies, La Porte, have been evaluated for processing at CES. These two samples are evaluations 0409-30 and 31. Potential volume of each stream is a one-time 20,000 gallons. Overall, neither of these streams will treat well in our system and are not recommended for processing. System 1 is an alternative for both streams, if desired.

Evaluation 0409-30 is said to contain 30-40% aluminum chlorhydrate. A form of this chemical is actually used as a flocculent in water treatment chemistry. This neat sample is murky gray in appearance. When allowed to sit over many hours a fine precipitant of approximately 25% settles out of solution, leaving a clear water phase. The precipitant would be the aluminum chloride. This sample has a pH of 3 and when attempts to treat are made, it solidifies as the lime is added. This would be the formation of aluminum hydroxide. By solidification, I mean a solid that must be dug out of a lab beaker. The neat sample contains around 80 ppm zinc. We cannot treat this material or put it into an outfall untreated. If we're looking for anything to do with it, we can solidify it in a vessel with the addition of lime and then shovel and scrape out the solids, which can then be sent to a landfill. This would not be any easy way to dispose of 20,000 gallons, and would cost more than sending it to System 1.

Evaluation 0409-31 has similar issues. While this material is said to contain only trace amounts of aluminum chlorhydrate, the sample does not treat. It too contains a fine silt of particulates that is most likely aluminum chloride, but obviously present in greater than trace quantities. While the treated water does not solidify, it simply does not produce a flocculent that will phase separate. The water remains as a thick murky slurry that would need to be filter pressed to recover any liquid. Using a sample that was vacuum filtered, the phenols on this particular sample are 40 ppm and the zinc is 9 ppm. Any recovered water would need trichlor treatment to lower the phenols to acceptable levels, and the zinc will treat out no further. While it is physically possible to treat this water, filter press the entire 20,000 plus gallons, and then trichlor the entire volume, I don't believe this is something we really want to tackle for anything less than what it would cost to send it to System 1.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

The table below summarizes the analytical testing.

Gulbrandsen Technologies		
	Evaluation 0409-30	Evaluation 0409-31
Solids, vol%	Trace	Trace
Odor	Not objectionable	Not objectionable
pH	3	3
Phenols, ppm	N/A	40
Oil, vol%	0	0
Treatability	Solidifies- Does Not Treat	Extremely Difficult
Metals, ppm		
Ni	0.436 (neat sample)	0
Zn	80 (neat sample)	9

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Clint Hopkins

Date: 4/28/09

From: Miles Root

Lab Memo: 09-081

Subject: **C-4 Environmental Evaluation 0409-29**

A sample of waste water from C-4 Environmental, Texas City, has been evaluated for processing at CES. This sample is evaluation 0409-29 and represents one drum/qtr of supposedly out of spec sodium hypochlorite, or bleach. This one drum may be processed with our waste water without issues.

This material has no bleach value, as a test for hypochlorite shows nothing. The water has a pH of 11, no phenols and a TOC of 1260 ppm. The neat sample has around 7 ppm of zinc, but this is such a small volume, that it does not matter. This is clean looking water that can just be dumped into our water system without issues.

The table below summarizes the analytical testing.

C-4 Environmental Evaluation 0409-29	
Solids, vol%	0
Odor	none
Hypochlorite, as Cl, g/L	0
pH	11
Phenols, ppm	0
TOC, mg/L	1,260
Oil, vol%	0
Treatability	Okay
Metals, ppm	
Ni	7.000
Zn	0.440

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/27/09

From: Miles Root

Lab Memo: 09-080

Subject: **Bigler Evaluation 0409-35**

A sample of waste water from Bigler, Pasadena, has been evaluated for processing at CES. This sample is evaluation 0409-35 and represents 1-2 loads/week of material. Due to the low flash point of this water, System 1 is our only viable option on this material.

This material is stated to contain both alcohols and other hydrocarbons in low percentages. The sample is water white in appearance and has a hydrocarbon type odor. The flash point of this material is between 100-105 deg F. This material does treat, but produces an above average amount of solids. The TOC is 42,580 on the treated water. There are no phenols and the metals are acceptable. There is no recyclable material in this water. System 1 is our only viable option for handling this material.

The table below summarizes the analytical testing.

Bigler	
Evaluation 0409-35	
Flash Point, deg F	100-105
Solids, vol%	0
Odor	hydrocarbon
pH	6
Phenols, ppm	0
TOC, mg/L	42,580
Oil, vol%	0
Treatability	Numerous Solids
Metals, ppm	
Ni	0.230
Zn	0.143

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/27/09

From: Miles Root

Lab Memo: 09-079

Subject: **Weatherford Evaluation 0409-32**

A sample of oily water from Weatherford on Pinemont Rd, has been evaluated for potential receipt by CES. This sample is evaluation 0409-32 and represents 500 gallons/qtr of material. This material is a weak ethylene glycol solution with less that 1% oil. We can receive this material to be moved out to Saber at a later date.

This material tests to be 13% ethylene glycol. It looks smells and feels like weak antifreeze, which is ethylene glycol. It contains less than 1% oil by centrifuge. Since ethylene glycol does not treat, we should move this material out to Saber when possible for their use. Pricing should cover at least our handling costs as I believe we give this material to Saber.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/27/09

From: Miles Root

Lab Memo: 09-078

Subject: **C-4 Environmental Evaluation 0409-28**

Two samples that represent two separate drums of hydrochloric acid from C-4 Environmental, Texas City, have been evaluated for potential use/processing at CES. These two samples are evaluation 0409-28. There is one 30 gallon drum of each material.

The drum labeled as #1 is HCl with a concentration of around 29%. It is a fuming acid, which we do not want to handle, due to the fumes. This drum is not recommended for treatment or usage.

The drum labeled as #2 is a very weak HCl solution with a pH of around 1. With a specific gravity of 1.005, its concentration as HCl will be around 1%. While this will come is as hazardous, we can treat the water without issues and discharge it safely. It is non-fuming at this concentration. This drum of material is recommended for treatment.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/22/09

From: Miles Root

Lab Memo: 09-077

Subject: **Borden Job #85010 Evaluation**

A sample of waste water from Borden, job #85010, has been evaluated in the laboratory for potential processing at CES. This load represents liquid from the cleaning of tanks containing such materials as milk, tea and orange juice. Overall, this material does not treat out with our regular water treat. System 1 is our only option, and the odor may be an issue.

The sample has a pH of 5 and contains 50% solids by centrifuge. The neat sample appears very murky, but can be centrifuged to produce a slightly opaque liquid above the 50% solids. In practicality, the sample has yet to phase out upon standing in the laboratory to this time, and may never phase separate upon standing. A standard water treatment of this material produces a material with the consistency of pudding. If treated, the entire load would need to be filter pressed. The resulting water and solids produced are very odorous.

The odor of this material is of a major concern even if the material would respond to chemical treatment. The TOC, metals and phenols were not run, as this material cannot really be processed at our site due to the odor. Let me restate this point again, with odor issues as they have been at CES, any type of treatment of this odorous water at this location is strongly discouraged.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Al Longoria
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/21/09

From: Miles Root

Lab Memo: 09-076

Subject: **KMCO Evaluation 0409-27**

A sample of oil with maleic acid from KMCO has been evaluated for potential use by CES. This sample is evaluation 0409-27. The volume of this material is 1,000 gallons on a one time basis. This material will need to go to our Class 1 sludge box.

This material has the consistency of thick molasses and is cloudy pale yellow/amber in appearance. It is some type of petroleum based oil with an unknown quantity of maleic acid. Maleic acid is a dicarboxylic acid, and should have little effect on this material other than to lower its pH. The pH of this material is around 3, but is difficult to measure since it is not an aqueous sample. A 50/50 mix with water and measurement of the aqueous phase was the sample prep used to determine pH.

A blend of this material on a 1:4 ratio of sample to black oil results in the formation of a material with the consistency of grease. Since it does not do well when mixed with black oil, we are rather limited in our processing options. Heating of the neat sample does not clear up its murkiness or phase separate any water layer.

I recommend that this 1,000 gallons of material be received and moved to a Class 1 sludge box for disposal.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman, Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/21/09

From: Miles Root

Lab Memo: 09-075

Subject: **Martin Transport Evaluation 0409-25**

A sample of base oil from Martin Transport, Houston, has been evaluated for potential sales by CES. This sample is evaluation 0409-25. The volume of this material is 8,000 gallons. This material will want to be sold "as is".

This oil has a very acceptable chlor-d-tect value of 400 with a viscosity @ 100 deg C is 12.0 cSt. Water is 2022 ppm. API gravity is 23. Color is approximately 6, and the sample has a murky appearance. These data are summarized in the table below.

Martin Transport	
Evaluation 0409-25	
chlor-d-tect, ppm	400
Color	6
Odor	Typical Oil
Viscosity, cSt, @ 100 deg C	12.9
API gravity	23
water, ppm	2,022

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/20/09

From: Miles Root

Lab Memo: 09-074

Subject: **Valero Evaluation 0409-24**

A sample of asphalt test oil from Valero, Three Rivers, has been evaluated for potential use by CES. This sample is evaluation 0409-24. This material represents three drums of asphalt test oil from their research labs. It is a one-time acquisition. We can accept this material and blend into black oil.

This material has a density of 0.95 and a chlor-d-tect of 700, an acceptable value. It blends well with our black oil. This material will be coming in drums and will be viscous if it comes in cold. In warm weather it pours okay and will not be an issue. These three drums many be mixed with our black oil upon receipt.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Shannon Ward
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/16/09

From: Miles Root

Lab Memo: 09-073

Subject: **Kinder Morgan Galena Park Evaluation 0409-20**

A sample of cashew nutshell liquid from Kinder Morgan, Galena Park, has been evaluated for potential sales by CES. This sample is evaluation 0409-20. This sample is from a future clean out of a tank. It is a one-time acquisition of unknown quantity. Using the current information at hand, we can recover this oil from the tank clean out and blend it with black oil. Receipt of the actual material will dictate specific procedures.

This material is stated to be cashew nutshell oil, but I suspect it is a product produced from this material for the following reasons: The MSDS states this material to be an alkylated phenolic resin. This material does not have any "nutty" odor. This material is soluble in toluene. In any case, this material will make a good blend with our black oil. It has a BTU value of 14070 with an API of 14.

This material is to be cleaned from its tank with both water (this oil is not water soluble, so this is strange), and delimonine. Delimonine is a non water soluble citrus based cleaner. Given this information it is strange that water is used in this tank cleaning operation without the use of some type of soap or detergent.

If the delimonine is soluble in the nut shell oil product, as it should be if used as a cleaner, then I'm speculating that the blend will also be miscible with our black oil. We should plan on receiving this material, looking at the sample to see its phases, and then proceed with a miscibility test with our black oil. As long as soap is not used in this cleaning process, any water that is used should phase separate out quickly. Assuming no soap is present, any water received should be able to be processed.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Shannon Ward
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/16/09

From: Miles Root

Lab Memo: 09-072

Subject: **Kinder Morgan Evaluation 0409-11**

A sample of sludge from Kinder Morgan, Pasadena Witter location, has been evaluated for potential processing at CES. This sample is evaluation 0409-11. This sample is from the clean out of fuel oil from tank 170-4 at Kinder Morgan. It is a one-time acquisition of two vacuum boxes. There are a couple of possibilities with this material, depending upon what it looks like when it arrives. We can do something with this material to recover some of the fuel oil.

This material is a very thick sludge containing water and hydrocarbon. I filtered it in the lab without any issues, using just a glass fiber filter pad without diatomaceous earth. I was able to produce a fairly dry filter cake. Whether or not this material can be filtered through our filter press will depend upon its pumpability. The ability to filter this material beforehand will be to our advantage.

If this material is not pumpable, then the water/fuel mix will need to be sucked from the boxes as best as can be done. My filtered sample did not require heat to separate the water and fuel and both were very clean looking. Any liquid that is sucked out will still need to have the fine solids/sludge that will be sucked out with it removed. Possibly running this through a filter press at this point would be advantageous, or even a filter sock. Another possibility is heating and settling.

The separated fuel does mix easily with our light ends or black oil. The water creates mostly solids when treated and will not phase out well. Most of the treated water will need to be filter pressed. This water has 10 ppm phenols and acceptable metals. Our other option for this water is System 1.

As with many of our evaluation samples of this nature, we will need to see just what the material looks like when it arrives. We can do some treatment and can recycle the recovered fuel. Benzene will most likely be an issue with this material on the disposal of any solids. Pricing should cover costs assuming that this entire load will need to be disposed as hazardous waste.

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The table below summarizes the analytical testing.

Kinder Morgan	
Evaluation 0409-11	
Odor	Hydrocarbon
pH	7
Phenols, ppm	10
Treatability	Many Solids Generated
Metals, ppm	
Ni	0.425
Zn	0.084
Cu	0.151
Cd	0.075
Cr	0.000

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To: Dana Carter
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/15/09

From: Miles Root

Lab Memo: 09-071

Subject: **<u>Andrews Transport Evaluation 0409-17</u>**

A sample of ethylene glycol from Andrews Transport has been evaluated for sales by CES. This sample is evaluation 0409-17 and represents used coolant from trucks. The potential of this source is 5-6 drums per year.

A percent ethylene glycol by refractive index shows this sample to be just over 59%. This sample also has a partial sheen of oil. There are no abnormal odors. No other testing was requested. This material may be marketed as used ethylene glycol for reprocessing.

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To: Dan Bowman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins, Ryan Thomas

Date: 4/13/09

From: Miles Root

Lab Memo: 09-070

Subject: **Bigler Evaluation 0409-13**

A sample of waste water from Bigler, Pasadena, has been evaluated for potential processing at CES. This sample is evaluation 0409-13 and represents water and oil used to coat the inside of a carbon steel tank. This is a one-time opportunity for a 20,000 gallon load. Overall, this material may be processed at CES without issues.

This water shows only a partial sheen of oil on top. It does not have a flash point below 140 deg F and has a pH of 11. This water treats okay and the resulting water has a TOC of only 1728 ppm, no phenols and acceptably low metals. If this material does come in with an oil layer we can decant it to the back, as the sheen on this sample does not mix with the water. We can easily treat this water without issues.

The table below summarizes the analytical testing.

Bigler	
Evaluation 0409-13	
Flash Point, deg F	>140
Solids, vol%	0
Odor	Acceptable
pH	11
Phenols, ppm	0
TOC, mg/L	1,728
Oil, vol%	partial sheen
Treatability	Okay
Metals, ppm	
Ni	0.092
Zn	0.000
Cu	0.028
Cd	0.015
Cr	0.396

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Houston, TX 77021
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To: Dana Carter
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins,
Ryan Thomas

Date: 4/13/09

From: Miles Root

Lab Memo: 09-069

Subject: **TT Barge Mile 237 Evaluation 0409-04**

A sample of sludge from TT Barge Mile 237 has been evaluated for potential processing at PACES. This sample is evaluation 0409-04 and represents sludge removed from a hazardous waste water holding tank at a barge cleaning facility. The potential volume of this material is 2-3 vacuum boxes per year. Overall, this material may be processed by centrifuging to recover minimal oil and water.

This material is hazardous due to its benzene content, which is stated to be 5000 – 10000 ppm. This sample was initially vacuum filtered to remove oil and water. The sample was filtered until the filter cake appeared dry and there was no longer any liquid making its way into the vacuum flask. A weighed sludge sample was filtered and then reweighed afterwards, along with measuring the recovered oil and water. The sample contains approximately 40% water, 3% oil and 57% solids. An ash determination of the solids shows 53.1% ash. The brick red color of this ash is a good indicator that it contains iron.

A chlor-d-tect on the recovered oil is 700 ppm. The water treats okay and has acceptable metals and low TOC. The phenols are high at 40 ppm, but they can be treated out with our trichlor solution if needed. This trichlor addition was performed on this water sample to reduce the phenols to zero.

Benzene will be the issue on this sample as this sample will carry a D018 code. This particular sample does not contain any significant amount of benzene, as the TOC on the treated water is only 30 ppm. Again I have a concern about how representative this sample is to material that may actually be received. Our benzene treatment is limited to heating or peroxide addition.

The table below summarizes the analytical testing.

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TT Barge Mile 237	
Evaluation 0409-04	
Solids, wt%	57
Water, vol%	40
Oil, vol%	3
pH	7
Ash on solids, wt%	53.1
Chlor-d-tect, ppm	700
Water Testing	
Treatability	Okay
TOC, mg/L	30
Phenols, ppm	40
Metals, ppm	
Ni	0.349
Zn	0.074
Cu	0.118
Cd	0.039
Cr	0.006

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Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/07/09

From: Miles Root

Lab Memo: 09-068

Subject: **Champion Technologies Evaluation 0409-06**

A sample of waste water from Champion Technologies, Fresno, has been tested for potential receipt and processing at CES. This sample is evaluation 0409-06. The potential volume of this material is around 17,500 gallons. Overall, the make-up of this water is best handled at System 1.

This water is non hazardous and has a pH of 2.2. It contains pentasodium EDTMP, which is a sodium salt of ethylene diamine tetra methylene phosphoric acid. This chemical is very similar to EDTA in that it is a chelating agent and will tie up metals so that they will not treat out. Literature indicates that this chemical's chelating capacity largely exceeds that of EDTA. The data from Champion indicates that this material is present in the 5-10% range.

As a strong chelating agent, we should not try to treat this water at CES or mix it with water that will be treated. System 1 is our best placement of this water. Dana will price this material to go to System 1, either via totes that will be transloaded at CES, or trailer loads that are picked up at Champion. My estimate is that there would be around 70-250 gallon totes.

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Tel. (713) 676-1460
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To: Matt Bowman, Joe Camp, Clint Hopkins, Ryan Thomas
Cc: Greg Bowman, Sam Brown, Julius Prantil

Date: 4/06/09

From: Miles Root

Lab Memo: 09-067

Subject: **Trichloroisocyanuric Acid Evaluation**

A sample of trichloroisocyanuric acid, (also known as TCCA, TCICA, and trichlor) has been evaluated for use as an oxidizer in phenol reduction at CES. Its use in this application will help treat high phenols in our waste water. It may also be used as an oxidizer in reducing odor in PACES waste water.

This material will come to us as a powder/granules in drums as a "floor sweep", meaning that it was literally swept off a floor from processing areas at the manufacturer. As such, this material will also contain paper, sticks, and anything else that happens to be on the floor when it is swept up. Due to this type of "production" each drum load may have some variability. Trichlor is a form of stabilized chlorine that is used, among other places, in the pool industry. In water solutions it is a good oxidizer and disinfectant. Trichlor is a molecule that slowly dissolves in water to produce hypochlorous acid from the evolution of free chlorine and isocyanuric acid, which acts as a chlorine stabilizer. Its solubility in water is given as 0.2% in literature.

TCCA has a very strong chlorine odor and proper PPE is required for its handling. A full face respirator with chlorine filters is required to protect both eyes and lungs. This first drum of material we received needed to be filtered to remove the debris that it contained.

Experimental

It was desired to have an easy to prepare formula and resulting mixture to use that would be "operations friendly". The current use of bleach treatment of adding one gallon for each ppm of phenol in a 5000 gallon load was attempted to be replicated. Testing was also performed to see the "shelf life" of a solution of trichlor along with its "refresh ability".

A 22 wt% solution was prepared, which equates to one approximately one drum trichlor to one 250 gallon tote of water. The sample was prepared in a one liter plastic sample bottle and allowed to mix for a couple of hours with a stir bar. The lid was cracked open as it was readily seen that the release of chlorine gas would quickly build pressure. Additional solutions of 5 wt% and 10 wt% solutions were also prepared for testing.

A sample of cresylic acid, consisting of 2,4 and 2,5 xylenol was obtained and prepared as a stock 1000 ppm solution. Aliquots from this stock were diluted to produce 100 ppm working solutions that would be used for the testing.

As each 100 ppm phenols solution was prepared, 2% by volume of each the 5%, 10% and 22% trichlor solutions were added. The mixtures were well shaken and then tested for phenols using our standard colorimetric CHEMets field test kit for phenols. Results were recorded over a period of up to one week. Shaking of the trichlor samples produces very

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Fax. (713) 676-1676

strong pressure build up in the bottles. In one incident, the cap was blown off a plastic bottle, without injury, when shaken just before testing. In practice, this material should never be mixed in airtight vessels, but should always have room for gas release and expansion.

Results

As seen by the data table, both the 10% and 22% solutions are still performing at nearly full strength after one week of use. The 10% concentration original solution is a good data point as it shows that the initial 22% solution will need to be reduced to at least that concentration before it really needs to have any additional trichlor put into the mixture. After one week the 10% solution is still able to bring the total phenols level below 15 ppm. Even the decanted water from the 22% trichlor is still decreasing the phenols to less than 15 ppm after sitting for one week.

The 22% TCCA solution may be re-prepared after the water is decanted without further trichlor usage. The slight solubility of trichlor in water allows this to happen. The second batch will not be quite 22%, but this is not critical, since a fresh 10% is capable of totally reducing phenols at the 2% addition level. When mixed for around 3 hours the solution is ready to use again. My test data shows a potential for 6 change outs of water with no trichlor powder addition.

It was also seen that the solution was most effective when actively mixed just before it was actually used. This would make sense, since there is more contact with water at that time and the solution also appears a little murkier than when allowed to sit for longer periods of time. The isocyanuric acid that is formed as the trichlor is mixed with water is helps to stabilize the hypochlorous acid.

Discussion

A 2% by volume of a 22% trichlor solution will treat 100 ppm phenol for every 5000 gallon load. In other words, 100 gallons of 22% trichlor will treat 100 ppm phenols in 5000 gallons. To expand on this, at 2% addition, one gallon of 22% trichlor will treat 1 ppm phenol. In practicality, this oxidizer will also react with other organics in solution. An "excess" of trichlor may be needed if the water contains other organic materials as well. In our favor, the phenols do not need to be treated down to 0 ppm, so in practicality, this 1:1 ratio should be a good starting point for calculations.

The 22% trichlor solution that is prepared may be used time and again after the water is decanted for use. Experimentation shows that even 10% solution strength is effective, and until around half of the solids are dissolved and consumed in the water, we should be able to reuse time and again the initial drum charge. Experimentation shows a potential 6 charges may be prepared from one drum of material. This number will vary depending upon each drum make-up, but several repeat loads are to be expected. When the solution becomes too weak to be effective, another drum of dry trichlor is added to the tote for water addition and mixing.

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Literature indicates that at some point the isocyanuric acid may build up in solution, causing the chlorine to become locked and unavailable for sanitizing. My testing never reached that point in its use as an oxidizer for phenols.

Proper PPE is a must when handling this material, whether in dry powder or liquid form. It is a strong oxidizer and must never be mixed with such chemicals as hydrogen peroxide. This mixing may result in the evolution of oxygen and has the capability to be explosive. Our use at PACES needs to be monitored.

Since it is a bleaching agent and disinfectant, it may also be used at PACES to reduce or eliminate odors of waste water shipments. It will also oxidize sulfides to sodium sulfate or thiosulfates when used as a part of the sulfide treatment for water to eliminate the sulfide odor.

Conclusion

Trichloroisocyanuric acid can do a good job at reducing or eliminating phenols in our waste water. An initial 22% mixture, approximately one drum/250 gal tote, can be used repeatedly by decanting the water and adding additional water. Around 6 refills of the tote with water may be expected before additional trichlor powder addition is necessary. Proper PPE usage is a must in dealing with this chemical. With proper handling and usage trichlor will be very beneficial for CES and PACES.

	All solutions are added at a 2% by volume level			
	TCCA	TCCA	TCCA	Decanted
Phenols, ppm	5 wt%	10 wt%	22 wt%	22% water
Phenols - initial	12	1	0	6
Phenols - 1 day		1	<1	6
Phenols - 2 days		1	<1	6
Phenols - 3 days		1	<1	6
Phenols - 4 days		8	<1	8
Phenols - 7 days		8	<1	12

The decanted 22% water is from the first decant and was tested over the 7 days for stability.

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Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/03/09

From: Miles Root

Lab Memo: 09-066

Subject: **<u>Preston Environmental Evaluation 0409-03</u>**

A sample of oil mixed with coolant from Preston Environmental, via Scot Technologies, has been tested for potential receipt at CES. This oil/coolant mix was also water washed, with the resulting water checked for treatability. This sample is evaluation 0409-03 and represents material from an oil tank that will be cleaned out with water and detergent. The potential volume of this stream is one load, one time. It should arrive in a vacuum truck. Overall, this oil mix does not pass the chlor-d-tect test. The wash water produced in the lab can be treated. The actual wash water will contain detergents, which will change its ease of treatability, depending upon the type of detergent used. The sludge/solids will need disposal. CES can take on this job, but need pricing that will make it profitable.

The oil/coolant mix has a chlor-d-tect of 1600 ppm, which will require a rebuttal in order to receive it for resale. A chlor-d-tect on the water washed oil was 1800 ppm. The oil's flash point is greater than 140 deg F.

Water added at a 4:1 ratio and thoroughly mixed does appear to pick up some organics. There are an above average amount of solids formed, and the solids do not quickly phase separate. TOC on the water is 749 ppm, a very low value, but an indicator that some of the coolant was extracted into this phase.

The solids in this material appear to be metal shavings mixed with dirt, sand and pebbles. Some of the metal pieces are shavings longer than one inch with widths of 1/8 inch. This type of material will possibly need to be dug out of a vacuum truck. Minimum charge for this would be $300 in itself.

My concerns with this material include the chlor-d-tect on the oil and the ease of treatability of the water once a detergent is added and mixed. Detergents will act to hold the oil into the water, so this source may actually require a heat and/or acid treat to break any emulsions that may form. Pricing on emulsion treating is at least $0.15/gallon. We can take this material, but just need pricing where we will be profitable.

The table below summarizes the analytical testing.

Preston Environmental	
Evaluation 0409-03	
Oil Flash Point, deg F	>140
chlor-d-tect, ppm	1600
Water Treatability	Higher solids, slow separation
Water TOC, ppm	749

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To: Dan Bowman, Morgan McCarley
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/02/09

From: Miles Root

Lab Memo: 09-065

Subject: **Sartomer Evaluation 0409-02**

A sample of waste water from Sartomer has been tested for potential processing at CES. This sample is evaluation 0409-02 and is waste water generated from a resin process. The potential volume of this stream is two loads per week. Overall, this water can be processed at CES with no issues, other than poor odor.

This waste water is clear in appearance with an objectionable but tolerable odor. It does not flash below 140 deg F and has a pH of 9. There are no solids. The water treats easily and produces a nice floc that separates out cleanly. The phenols are 2 ppm. TOC is a low 2638 ppm. The metals are all at acceptable levels.

This water looks good for processing at CES. While the odor of this material is objectionable, as I said above, it is tolerable. The table below summarizes the analytical testing.

Sartomer	
Evaluation 0409-02	
Flash Point, deg F	>140
Solids, vol%	0
Odor	Somewhat Objectionable
pH	9
Phenols, ppm	2
TOC, mg/L	2,638
Oil, vol%	0
Treatability	Okay
Metals, ppm	
Ni	0.108
Zn	0.103
Cu	0.180
Cd	0.082
Cr	0.000

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Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman, Morgan McCarley
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 4/01/09

From: Miles Root

Lab Memo: 09-064

Subject: **Technisand Evaluation 0409-01**

A sample of waste water from Technisand has been tested on three parameters for recertification from this customer. This sample is evaluation 0409-01, and is a sample of mixed caustic, acid and water. This stream is currently sent to System 1. Potential volume of this stream is one trailer every 3-6 months.

The test results are summarized in the table below.

Technisand	
Evaluation 0409-01	
Oils, vol%, visual	None
Flash Point, deg F	>140
pH	10.35

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To: Joy Baker, Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/31/09

From: Miles Root

Lab Memo: 09-063

Subject: **Afton Evaluation 0209-34**

A sample of oil additive from Afton, Port Arthur, has been tested on two parameters for marketing purposes. This sample is evaluation 0209-34, and is a sample of overheated additive, HiTEC 7050, that came from rail cars. Volume of this material is 40,000 gallons and is a one time opportunity.

The two tests requested for this material are viscosity and ash. Ash is 0.58 wt%. Viscosity at 100 deg C is 176 cSt.

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Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/27/09

From: Miles Root

Lab Memo: 09-062

Subject: **Trimac Evaluation 0309-54**

A sample of hydrochloric acid from Trimac, Pasadena, has been evaluated for potential use at PACES. This sample is evaluation 0309-54. This material has a potential volume of 5-10 drums per quarter. Overall, this material is not exactly what it is supposed to be and without further information I don't recommend its use for our PACES business.

This material is said to be only hydrochloric acid. It has a density of 1.28. Commercially produced HCl, which is a reagent grade, has a density of 1.189 at a concentration of 38%. Essentially HCl cannot be produced at any greater concentration that this. This much higher density is the key indicator that this is not what it is claimed to be. It is loaded up with something significant to increase its density to this extent.

This acid does react with our PACES feedstocks. Two separate samples from PACES were tested. While large volumes of acid are required to acidify the samples and release hydrogen sulfide, it can be done. Without knowing what this acid actually contains as its impurities, I cannot recommend its use.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/26/09

From: Miles Root

Lab Memo: 09-061

Subject: **Vertex Recovery Bisulfite/Thiosulfate Stream**

A sample of waste water containing sodium bisulfate and sodium thiosulfates has been evaluated for processing at CES. This sample represents approximately 600 gallons of material containing approximately 30% sodium thiosulfates and 38-44% sodium bisulfate. These values are highly suspect, as they are both above the solubility limits of these components in water. My recommendation is that we do not take this material.

Sodium bisulfate is used as a preservative in a variety of food related products in very small concentrations. It is listed as a hazardous substance. When in an acid medium, the bisulfate releases sulfur dioxide gas, which is toxic. This sample has a pH of 2. This particular sample does release this gas when the sample bottle is opened. It is a very sharp odor. The gas continues to be released as the bottle swells up over time.

Even though this material can be treated with our water, the resulting treated material is solids, and basically the entire volume would need to be filter pressed.

I don't recommend that we take this material for treatment. Even the small pint sized bottle I have gives off enough sulfur dioxide when opened to be hazardous. The potential for toxic gas release and safety concerns over this small volume of material outweigh the benefits.

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Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/25/09

From: Miles Root

Lab Memo: 09-060

Subject: **Javalina Refining Evaluations 0309-48-49**

Two samples of waste water from Javalina Refining, Corpus Christi, have been evaluated for potential processing at CES/PACES. These are sample evaluations 0309-48 and 49. These two samples make up the top and bottoms from a flare knock out pot. Potential volume of these two streams is 260 barrels/month for the bottom phase and 130 barrels/year for the top phase. We have the potential of using the top phase as a feed at PACES to recover the sulfides. The bottom phase may potentially be processed at CES.

The bottom phase is murky amber in appearance with a slight hydrocarbon odor. There is a partial sheen of an organic on top of the water. This material has D001 and D018 codes for flash and benzene. This sample does not flash below 140 deg F. It has a pH of 8 and treats easily and without issues. The TOC on the treated water is 122 ppm. Phenols are 5 ppm. Metals are all at acceptable levels. The D001 and D018 codes may be eliminated by heating over time. This particular sample does not seem to have either of these issues, but actual receipts may be different.

The top phase sample, when allowed to sit, has two layers, water and organics. It has a definite hydrocarbon odor. A spin out by centrifuge shows 28% solids. The top water phase is murky in appearance and contains oil. This material also carries D001 and D018 waste codes. This sample has a flash point less than 80 deg F. The bottom phase is black and contains sludgy type material. When acidified, hydrogen sulfide is released along with what appears to be carbon dioxide. This release of gases causes the sample to at least double in volume as the pressure builds up in solution. Thorough mixing breaks up most of the sludge and a hydrocarbon phases to the top of the acidified water. The top hydrocarbon mixes with light ends.

Titration results on this top phase show 0.66% sulfides and 1.56 % calculated as sodium carbonate. We could use this material with our PACES feed; recover the sulfides and some oil as well. The problem with this type of material is that you never know what you will actually receive. What the flare looks like today may not be what it actually is tomorrow. If this sample is representative, after acidification treatment, we will end up with a little sludge, but less than that created by neat SIB material, and also some hydrocarbons on top. With only one load per year, we may have a good potential to take this material at PACES.

The table below summarizes the analytical testing.

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Fax. (713) 676-1676

Javalina Refining		
	Evaluation 0309-49	Evaluation 0309-48
Solids, vol%	Trace	28
Odor	Very slight hydrocarbon	Strong hydrocarbon
pH	8	9
Sulfides, as S, wt%	negative for sulfides	0.66
Carbonates, as Na2CO3, wt%		1.56
Phenols, ppm	5	
TOC, mg/L	122	
Oil, vol%	0	
Treatability	Acceptable	
Metals, ppm		
Ni	0.436	
Zn	0.124	
Cu	0.076	
Cd	0.067	

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Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/24/09

From: Miles Root

Lab Memo: 09-059

Subject: **Intergulf Evaluation 0309-51**

A sample of waste water from Intergulf via Hunting Petrotube, has been evaluated for potential processing at CES. This sample is evaluation 0309-51. This water is generated from a copper plating operation and carries a D002 waste code. The potential volume of this stream is one load per month. Due to the high metals content we cannot process this stream at CES.

The pH of this sample is 6. It does not match the D002 waste code. This water is deep purple in appearance and is without solids. When treated, excessive solids are generated. The treated water is deep purple in appearance. The TOC is 8863 ppm and there are no phenols.

The metals are the real issue with this water. Nickel and copper are very high at 928 and 1500 ppm respectively. These values were obtained through quantitative dilutions of the treated sample to get them within our calibration range on the AA, and are accurate. We cannot handle metals in this high range, even with "equalization", as we just don't have the volume to do so.

The table below summarizes the analytical testing.

Intergulf - Hunting Petrotube	
Evaluation 0309-51	
Solids, vol%	0
Odor	Okay
pH	6
Phenols, ppm	0
TOC, mg/L	8,863
Oil, vol%	0
Treatability	Excessive Solids
Metals, ppm	
Ni	928
Zn	0.153
Cu	1507
Cd	0.079
Cr	0.000

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/24/09

From: Miles Root

Lab Memo: 09-058

Subject: **Debusk Environmental Evaluation 0309-43**

A sample of waste water from Debusk Environmental via Fluor, Franklin, TX, has been evaluated for potential processing at CES. This sample is evaluation 0309-43. This water is generated from a chemical cleaning process. This is a one-time stream of 150,000 gallons. Overall, the ammonia generated from the processing of this water is too high for our use. Also, the chromium alo ng with the nickel and zinc in this water are difficult to treat properly. Its acquisition is not recommended.

This material has a D007 waste code for chromium. It also contains up to 6% ammonium citrate. The water has a pH of 10. When treated, excessive sludge type solids are formed and ammonia is generated in excessive amounts. This ammonia is what will keep this stream out of CES. The TOC on this treated water is 1046 ppm and there are no phenols.

Since I knew that this stream contained excessive chromium, I did some creative pH adjustments in the metals treatment. This material has high nickel and zinc, along with chromium. Besides the ammonia, the best pH treat for chromium is around 8.5. Chromium is also difficult to treat due to its valence states. I was never really successful in reducing all of these three metals at the same time with our treatment. Low chromium will mean high nickel and zinc, due to the differences in pH. Metals are difficult to treat in one run, but the ammonia is the real issue with this water.

This stream is not recommended due to its high ammonia content when treated. Along with ammonia odor here at CES, the city water would also see high ammonia levels as well. This is not an area we want to get into at this point.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/23/09

From: Miles Root

Lab Memo: 09-057

Subject: **Rineco - Channel Chemical Evaluation 0309-50**

A sample of waste water from Rineco, via Channel Chemical, Gulfport, MS, has been evaluated for potential processing at CES. This sample is evaluation 0309-50. This water is generated from some type of chemical process and may contain naphtha, hydrochloric acid, potassium chloride and formaldehyde. This material carries both D001 and D002 waste codes. Potential volume for this stream is 5000 gallons/month. Overall, this water may be treated at CES.

This water is slightly murky with an amber appearance. It has a somewhat objectionable odor. This water has a pH of 1.1. This particular sample does not have a flash point below 140 deg F. The water will not treat to a clear appearance with our standard water treat. The treated water has a murky yellow appearance and retains its somewhat objectionable odor. The metals are all at acceptable levels. The phenols are only 2 ppm.

The TOC on the treated water is 7844 ppm, which indicates that this water is not loaded up with the potentially higher concentration of organics. In other words, this is probably a "good" sample and our actual receipts may not be quite so nice. It is impossible to say for sure.

An attempt to drive off any other "organics" by heating to see if I could produce a clear water after treat were not successful. Our game plan to treat this water will depend upon what it looks like upon receipt. If the material does come in with a flash point, then a simple treat may eliminate it. Excessive organics will need heat treatment to eliminate low flash on the water if standard water treatment is not successful. Since the organics are to consist of naphtha and formaldehyde, we should be able to do this. The low pH is not an issue and our water treat will only require on the use of ferric chloride followed by lime and polymer.

The table below summarizes the analytical testing.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Rineco - Channel Chemical	
Evaluation 0309-44	
Solids, vol%	0
Odor	Somewhat Objectionable
pH	1.1
Phenols, ppm	2
TOC, mg/L	7,844
Oil, vol%	0
Treatability	Okay, but murky water
Metals, ppm	
Ni	1.430
Zn	0.612
Cu	0.290
Cd	0.374
Cr	0.000

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman, Jennifer Rust
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/23/09

From: Miles Root

Lab Memo: 09-056

Subject: **Environmental Disposal Solutions (Duratherm) Evaluations 0309-44 & 45**

Two samples of waste water from Environmental Disposal Solutions, via Duratherm, have been evaluated for potential processing at CES. These samples are evaluations 0309-44 and 45. Both of these streams are from Duratherm process water. This is probably originates from Duratherm, which, among other things, is a heat transfer liquids technology company. The potential volume for each of these two streams is around 200,000 gallons/year. Overall, one of these two streams is high in phenols and will require oxidizer treatment. Otherwise, both steams are acceptable for treatment at CES.

Evaluation 0309-44 is labeled "centrate". It is fairly clean looking water with a trace of solids and an odor that is not objectionable. The water has a pH of 9, treats easily and has a TOC of 1969 ppm with 100 ppm phenols. This stream will need an oxidizer treatment, which we can perform at CES. Metals are at acceptable levels.

Evaluation 0309-45 is labeled "PV-117". It also is fairly clean looking water with a trace of solids and an acceptable odor. The water has a pH of 7, treats easily and has a TOC of 1484 ppm with 10 ppm phenols. The metals are at acceptable levels. This stream will not need any special handling.

Both of these streams are acceptable for treatment at CES. It is best if we can acquire our "floor sweep" oxidizer and use in our phenol treatment scheme as quickly as possible.

The table below summarizes the analytical testing.

Environmental Disposal Solutions - Duratherm		
	Evaluation 0309-44	Evaluation 0309-45
	Centrate	PV-117
Solids, vol%	trace	trace
Odor	Acceptable	Acceptable
pH	9	7
Phenols, ppm	100	10
TOC, mg/L	1,969	1,484
Oil, vol%	0	0
Treatability	Okay	Okay
Metals, ppm		
Ni	0.118	0.153
Zn	0.084	0.080
Cu	0.042	0.061
Cd	0.047	0.040

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter, Morgan McCarley
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/19/09

From: Miles Root

Lab Memo: 09-055

Subject: **<u>GATX Hearne Evaluation 0309-42</u>**

A sample of sulfuric acid from GATX, Hearne, has been evaluated for use at CES. This sample is evaluation 0309-40. This is a potential one-time acquisition of approximately 1000 gallons of sulfuric acid. This acid is available by tank trailer. Its acquisition is recommended.

This acid has a density of 1.786 which is an approximate 86% concentration of sulfuric acid. It is pale yellow in appearance with no particulates and no strong odor. Metals on this acid show 14 ppm nickel and no zinc. A sample of waste water was treated with this acid to check its usage at CES. Using even an excess of acid in our standard water treat, the final treated water showed no nickel increase. This is due to the fact that our actual usage of this acid will be small in comparison to the final volume of treated water. We will have no issues using this acid at CES.

Acid like this can also be used at PACES, and any excess acid we may acquire could potentially be used in our NaSH business as well.

The table below summarizes the analytical testing.

GATX Hearne	
Evaluation 0309-42	
Density	1.786
Sulfuric Acid, %	86
Usability at CES	Okay
Appearance	Pale Yellow

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman, Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/19/09

From: Miles Root

Lab Memo: 09-054

Subject: **Texmark Evaluation 0309-40**

A sample of hydrocarbons from Texmark has been evaluated for potential marketing by CES. This sample is evaluation 0309-40. This material is the bottoms cut from distillation of biofuels. The potential volume of this stream is 40,000 gallons/month. This material looks good for marketing "as is" or may be blended into our light ends. Its acquisition is recommended.

This material is dark brown in appearance. It has an API gravity of 30, which is an approximate specific gravity of 0.875. Water by Hydro Scout is 2478 ppm. The ash is 0.07 wt%. BTU value is 13,828. This material blends well with our light ends. It does not flash below 140 deg F. A simple extraction with water adds less than 1% of volume to the water, which indicates that this material contains essentially no water soluble organics. The fact that it does not flash says it has minimal or no methanol/ethanol. This material may be sold "as is" as a product.

The table below summarizes the analytical testing.

Texmark	
Evaluation 0309-40	
Flash Point, deg F	>140
Ash, wt%	0.07
API Gravity	30
Specific Gravity	0.875
Water, ppm	2,478
Light Ends Suitability	Okay
BTU/lb	13,828

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/18/09

From: Miles Root

Lab Memo: 09-053

Subject: **Environmental Disposal Solutions Evaluation 0309-39**

A sample of waste water from Environmental Disposal Solutions (PSC @ Ohmstede), has been evaluated for potential processing at CES. This sample is evaluation 0309-39. The potential volume of this stream is one load per week. Overall, this stream may be discharged directly without treatment due to its low impurities for all of our discharge specifications. We will have no issues taking this water at CES.

This stream is a listed K050 waste, "heat exchanger bundle cleaning sludge from the petroleum refining industry". This particular stream analyzes to be a very low in impurities. The sample has a pH of 7. Even though this sample treats easily, it does not need treatment. There are no phenols, the metals are almost non-existent and the TOC is 930 ppm. This water has a very slight odor but it is not objectionable. This particular sample had less than 1% solids by centrifuge as well. Since this is a K waste, we will not want to produce solids in treating this water, as they would also carry the K waste code. This water must be discharged directly to the city without treatment and will lose its waste code characteristic. There will be no issues with handling this water in this fashion.

The table below summarizes the analytical testing.

Environmental Disposal Solutions	
Evaluation 0309-39	
Solids, vol%	<1
Odor	Acceptable
pH	7
Phenols, ppm	0
TOC, mg/L	930
Oil, vol%	0
Treatability	Do Not Treat
Metals, ppm	
Ni	0.000
Zn	0.008
Cu	0.000
Cd	0.000

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman, Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/17/09

From: Miles Root

Lab Memo: 09-052

Subject: **Chemetall (SQM) Evaluations 0309-36 & 37**

Two samples of oil from Chemetall (SQM) have been evaluated for potential processing at CES. These samples are evaluations 0309-36 and 37. The potential volume of each of these two streams is 4-6 drums per quarter. Overall, low flash point on one source and high chlor-d-tect on the second make these two streams less desirable than typical.

Evaluation 0309-36 originates from equipment oil changes, and is a mix of gear lube, motor and water. The chlor-d-tect on this sample is 2000 ppm, which means it will need a rebuttal in order for us to receive it. This sample is two phased, with 35% water, which has a pH of 6. The flash point of this oil is greater than 90 deg F. If we can get a rebuttal on this source, then it should be acceptable for our processing at CES.

Evaluation 0309-37 is a mineral oil that is used in the production of lithium products. This particular source contains a small amount of toluene, and therefore has a flash point less than 80 deg F. This was my lowest thermometer reading, but its flash may actually be much less than that. This sample contains approximately 5% solids, but no actual water layer. The chlor-d-tect is 400 ppm. There is an outside possibility that a buyer could be found for these few drums of low flash mineral oil, but Kim will need to have her input on this.

The table below summarizes the analytical data.

Chemetall (SQM)		
	0309-36	0309-37
Solids, vol%	0	5
Water, vol%	35	<1
Water pH	6	NA
Flash Point, deg F	> 90	<80
Chlor-d-tect, ppm	2,000	400

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman, Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/17/09

From: Miles Root

Lab Memo: 09-051

Subject: **Braid Logistics Evaluation 0309-34**

A sample of mineral oil from Braid Logistics has been evaluated for potential acquisition and marketing. This evaluation is 0309-34. Available quantity of this source is four drums per quarter. This material looks very good and should be acquired at a marketable price.

This mineral oil is water white in appearance. It has a specific gravity of 0.826, which corresponds to an API gravity of 40. It does not flash less than 90 deg F. The Hydro Scout water is 0 ppm. These drums should probably be sold "as is". This material may be blended with base oil, but there is so little of it that it will not make a difference in color with a 5000 gallon load.

The table below summarizes the analytical testing.

Braid Logistics	
Evaluation 0309-34	
Specific Gravity	0.826
API Gravity	40
Appearance	Water White
Odor	Almost None
Flash Point, deg F	> 90

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman, Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/17/09

From: Miles Root

Lab Memo: 09-050

Subject: **Martin Transport Evaluations 0309-31 & 32**

Two samples of diesel/oil mix have been evaluated for potential acquisition and sales from Martin Transport, located at 1562 Jacinto Port. These evaluations are 0309-31 and 32. Available quantity of these two streams is approximately 5000 gallons each. Both of these products can be acquired and marketed "as is" with no further processing, and is recommended.

These two streams are a mix of diesel and oil. They both have flash points greater than 140 deg F, as they should. The ash contents are 0.17% and 0.78%, so they are different. We will want to market these two streams without further processing.

The table below summarizes the analytical testing.

Martin Transport		
	0309-31	0309-32
Density	0.87	0.88
API Gravity	31	29
Flash Point, deg F	>140	>140
Ash, wt%	0.17	0.78
Odor	Diesel	Diesel

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/18/09

From: Miles Root

Lab Memo: 09-049-A

Subject: **Hexion Diboll Evaluation 0309-30**

A sample of waste water from Hexion, Diboll, has been evaluated for processing at CES. This sample is evaluation 03090-30 and is water generated from reactor vessel cleaning. The potential volume of this stream is 10,000 gallons/week. Overall, the first three loads of this formaldehyde containing water will need to be processed to System 1. Further receipts may be handled at CES without issue.

According to the evaluation form, this water may have up to 6% formaldehyde (but usually less than 1%) and will have less than 100 ppm phenols. This particular sample is clean looking water with a pH of 5. The sample treats easily. The treated water has no phenols, low metals and a TOC of 34,350. The formaldehyde levels are the issue with this water.

Information from Gary Brauckman indicates that this material will not be a hazardous waste. High formaldehyde levels on the first three loads will cause us to move this material to System 1. We will not want to treat this material at CES even though we could in theory set up to do so. High levels of formaldehyde will be an issue with the city down the road, so System 1 is recommended for these first three loads. Receipts after the first three loads should have much lower TOC values, and this will be verified by the Lab as they are received.

As a potential treat, for the record, formaldehyde can be oxidized to formic acid with the addition of caustic and hydrogen peroxide. This is done at pH of 10-11 and takes 10 minutes to three hours, depending upon conditions. A Tollen's reagent is used as a qualitative test reagent to check for the presence of aldehydes. We do not currently have this reagent but it may be commercially obtained.

Once the first three loads are handled at System 1, further receipts of this material may not require our standard water treatment. Our routine check of the TOC level of incoming receipts will indicate whether or not treatment is needed for this particular stream. Since the metals will be low, it is possible that further receipts may simply be used as a part of our water "equalization" program in reducing potential high metal streams. Operations/Lab will direct these loads as they are received to best utilize them for processing at CES.

The table below summarizes the analytical testing.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Hexion, Diboll	
Evaluation 0309-30	
Solids, vol%	0
Odor	Acceptable
pH	5
Phenols, ppm	0
TOC, mg/L	34,350
Oil, vol%	0
Treatability	Okay
Metals, ppm	
Ni	0.134
Zn	0.176
Cu	0.090
Cd	0.053

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/18/09

From: Miles Root

Lab Memo: 09-049

Subject: **Hexion Diboll Evaluation 0309-30**

A sample of waste water from Hexion, Diboll, has been evaluated for processing at CES. This sample is evaluation 03090-30 and is water generated from reactor vessel cleaning. The potential volume of this stream is 10,000 gallons/week. Overall, the first three loads of this formaldehyde containing water will require special processing, depending upon our discharge limits. Afterwards, treatment will not be an issue.

According to the evaluation form, this water may have up to 6% formaldehyde (but usually less than 1%) and will have less than 100 ppm phenols. This particular sample is clean looking water with a pH of 5. The sample treats easily. The treated water has no phenols, low metals and a TOC of 34,350. The formaldehyde levels are the issue with this water.

Gary has stated that the first three loads of this material will be sent as a hazardous waste. This material may need special treatment before it can be discharged. Aldehydes such as formaldehyde are "easily" oxidized with air to form their corresponding carboxylic acid, but this could take hours and substantial mixing is required. In the case of formaldehyde, formic acid is formed. This is the chemical that puts the sting in ant bites.

Formaldehyde can also be oxidized to formic acid with the addition of caustic and hydrogen peroxide. This is done at pH of 10-11 and takes 10 minutes to three hours, depending upon conditions. A Tollen's reagent is used as a qualitative test reagent to check for the presence of aldehydes. We do not currently have this reagent but it may be commercially obtained.

Discharge limits will need to be known before a definitive action plan can be developed. This type of treatment would not involve the use of our standard water treatment procedure, but would be a specially developed scheme for these first three loads.

Further receipts of this material may not require treatment. It is possible that further receipts may simply be used as a part of our water "equalization" program in reducing potential high metal streams. The metals content of this sample are low and there are no impurities other than the formaldehyde. Again, actual discharge limits for formaldehyde will need to be known for us to confirm a standard treatment protocol for this material.

The table below summarizes the analytical testing.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Hexion, Diboll	
Evaluation 0309-30	
Solids, vol%	0
Odor	Acceptable
pH	5
Phenols, ppm	0
TOC, mg/L	34,350
Oil, vol%	0
Treatability	Okay
Metals, ppm	
Ni	0.134
Zn	0.176
Cu	0.090
Cd	0.053

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/16/09

From: Miles Root

Lab Memo: 09-048

Subject: **Valero Evaluation 0309-27**

A sample of water and oil sludge from Valero through Environmental Disposal Solutions has been evaluated for processing at CES. This sample is evaluation 0309-27 and is water generated from the cleaning of heat exchanger bundles. The potential volume of this stream is 10,000 gallons/year. Overall, this K listed waste releases hydrogen sulfide when acidified and is not recommended for treatment at CES.

This material is classified as K050 listed waste for being heat exchanger bundle cleaning sludge from the petroleum refining industry. This material is truly sludge with no recoverable oils. This sludge has the consistency of pudding. This sample is approximately 60% sludge with water. The water can be decanted from the sludge, but then must be heated and acidified in order for it to be broken out cleanly. Upon acidification, this water releases hydrogen sulfide, as confirmed with lead acetate paper. It is for this reason that this material should not be processed at CES.

The pH of this water is 7. Its flash point is greater than 140 deg F. After heating and acidification, the treated water has a TOC of 3506 ppm. Metals and phenols are acceptable on this water. Since this is a K listed waste, all of the solids from this treat would need to be separated out as hazardous waste. In practice this could generally be done in our small filter press, but the hydrogen sulfide is the real issue here.

This stream is not recommended due to the issue with hydrogen sulfide generation. The sulfides present in the sludge are the source, but the water is contaminated none the less. A beaker of acidified material was enough to fill my lab with a rather unpleasant odor, even under a hood. The table below summarizes the analytical testing.

Valero	
Evaluation 0309-27	
Solids, vol%	10
Acidified Odor	Hydrogen Sulfide
pH	7
Phenols, ppm	2
TOC, mg/L	3,506
Oily Sludge, vol%	60
Treatability	H_2S release
Metals, ppm	
Ni	0.281
Zn	0.065
Cu	0.023
Cd	0.116

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker, Al Longoria
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/13/09

From: Miles Root

Lab Memo: 09-047

Subject: **Jefferson County Drainage District 7 Evaluation 0309-33**

A sample of water from Jefferson County Drainage District 7 has been evaluated for processing at CES. This sample is evaluation 03090-33 and is water generated from fire fighting that contains a foam fire extinguishing media. The potential volume of this stream is 100,000 plus gallons. Overall, this is good looking water that will not need to go through our treatment process, as it is so clean.

The ingredients of the foam used in fire fighting are proprietary, but the MSDS sheet states that it contains propylene glycol and surfactants, among other things. For sure, this water does not contain many impurities. This is clean looking water with a trace of solids that look like dirt or tank scale. This water has a pH of 6, no phenols; very low metals, and TOC of 1027 ppm. It does not even need to be treated. It may be discharged directly after our clarifier or used for water equalization in our plant process, whatever operation's needs are at the time it is received. It will present no issues.

The table below summarizes the analytical testing.

Jefferson County Drainage District 7	
Evaluation 0309-33	
Solids, vol%	trace
Odor	None
pH	6
Phenols, ppm	0
TOC, mg/L	1,027
Oil, vol%	0
Treatability	None Needed
Metals, ppm	
Ni	0.000
Zn	0.194
Cu	0.000
Cd	0.000
Cr	0.000

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/12/09

From: Miles Root

Lab Memo: 09-046

Subject: **Trelleborg Evaluation 0309-24**

A sample of chemical waste water from Trelleborg, a PCI account, has been evaluated for potential recycling/processing at CES. This sample is evaluation 0309-24 and represents material from a chemical waste drain. There is one load of this material available. Overall, this material is best handled as a redirect to System 1.

This chemical waste drain is said to contain such chemicals as MEK, acetone and toluene. This particular sample does not have a flash point less than 140 deg F. Standard heat and acidification of the sample to break out any hydrocarbons resulted only in a partial sheen of hydrocarbon type material. In practicality, there would be no recoverable organics in this material.

Next, a standard water treat was performed. This treat included the sheen of organics that are noted above. The TOC on the treated water was 11,960 ppm, rather low for material that is to contain any appreciable organics. Phenols are very high at approximately 500 ppm. Metals analysis shows a high zinc concentration. With bleach priced at over $2.50/gal it would cost over $1250 just to treat the phenols at CES.

I have no other information on any other applicable waste codes for this source. This being considered, this material is best redirected to System 1. The table below summarizes the analytical testing.

Trelleborg (PCI)	
Evaluation 0309-24	
Solids, vol%	2
Odor	Slight organic
pH	11
Phenols, ppm	500
TOC, mg/L	11,960
Oil, vol%	trace
Treatability	Okay
Metals, ppm	
Ni	0.529
Zn	4.472
Cu	0.137
Cd	0.060

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/12/09

From: Miles Root

Lab Memo: 09-045

Subject: **Rineco NuStar Terminals Evaluation 0309-04B**

A second sample of waste water from Rineco, NuStar Terminals, has been evaluated for handling by CES. This sample is evaluation 0309-04B. It represents a second sample taken to see if it is similar to one reviewed in memo 09-039 on March 6. This material is stated to contain 2-methoxy ethanol. It is a once a year trailer load receipt potential. Overall, this material smells and looks just like the first sample. It will need to be redirected to System 1.

This material will come to us with a D001 code for low flash point. The boiling point of this compound is too high, at 257 deg F, to be removed in our bullet trailer. The profile indicates that this source may contain up to 5% 2-methoxy ethanol. We have no treatment option to deal with this material with low flash and high boiling point. It needs to be received and then redirected to System 1. Dana has indicated that her pricing proposal will cover these costs, so there are no issues here.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/11/09

From: Miles Root

Lab Memo: 09-044

Subject: **TT Barge Evaluation 0309-20**

A sample of oily water from TT Barge has been evaluated for potential processing at CES. This sample is evaluation 0309-20, and is material from the cleaning of barges last containing benzene related materials. The potential volume of this source is three loads per week. Overall, we can process this oily water with our standard acid/heat treat. The benzene, if any, should not be an issue, as it will stay in the oil phase when this material is heated and acidified. I recommend we pursue the acquisition of this stream for processing.

The oily water has an approximate 2% oil layer and a pH of 6.. It has a slight hydrocarbon odor and has only a trace of solids. The water treats easily once the oil is removed. The phenol and metals are acceptable. The TOC is 11,490 ppm, so we need to cover this extra cost to us in our charges. This material should come in as a D018 waste but our processing will eliminate that waste code in our water. There are no other concerns with this material.

The table below summarizes the analytical testing.

TT Barge	
Evaluation 0309-20	
Solids, vol%	Trace
Odor	Slight Hydrocarbon
pH	6
Phenols, ppm	5
TOC, mg/L	11,490
Oil, vol%	2
Treatability	OK
Metals, ppm	
Ni	0.011
Zn	0.010
Cu	0.000
Cd	0.028

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/11/09

From: Miles Root

Lab Memo: 09-043

Subject: **PSC – Chemtura/BioLabs Evaluation 0309-10**

A sample of oxidizer from PSC (Chemtura/BioLabs), Lake Charles, LA, has been evaluated for use as an oxidizing agent or bleach substitute for CES. This sample is evaluation 0309-10, and is floor sweep material from a pool cleaner manufacturer. The potential volume of this source is 5-7 drums per week. Overall, this is a good material for use in both our NaSH water treatment scheme at CES and also as an odor reducer for PACES waste water.

This material is a non-homogeneous off-white powder with a strong bleach type odor. It has an approximate density of 1.0. When mixed with water it has solid particulates that do not go into solution. This is tolerable for us. It has enough oxidizing powder to oxidize sulfides to sulfates or thiosulfates in our water, thereby killing the sulfide odor.

A sample of high zinc water, approximately 25 ppm, was initially treated with our standard ferric chloride, sulfuric, lime and polymer scheme. This sample was centrifuged to remove the solids that were formed. The water from this treat was then treated with CES NaSH in excess amount to react with the zinc. The zinc sulfides that are formed are white in appearance. This sample was well mixed and then spun down to remove the floc/solids. This water was then treated with the powdered oxidizer in an attempt to remove the odor.

The resulting treated water had a bleach type odor that was not objectionable. The water was also tested for sulfides with a CHEMets hydrogen sulfide test kit, #K-9510. This test kit is similar to the one used for phenols, and is good for low levels of sulfides, in the 1-10 ppm range. Our discharge water needs to be less than 5 ppm sulfides, and this is a good technique for that determination. The oxidizer treated water showed 1 ppm sulfides.

While each load of high metals water will need specific work-up to determine optimum NaSH and oxidizer addition, this technology will work. It is not recommend for high metals streams that tend to form sludges that contain little water. Our typical 10-25 ppm high zinc water will work well with this treat system using this oxidizer.

The powder form of this oxidizer may be the recommended use when treating NaSH water. The powder does not have any violent reactions when used and the odor is limited to that of strong bleach. A 3:5 weight ratio of powdered oxidizer to NaSH product is a good maximum starting estimate for our usage. At a 2% NaSH treat this equates to 835 lbs oxidizer per 5000 gallon treat. There are numerous variables that will alter our additions for each particular treatment, and this is just an example.

This oxidizer also works well in reducing the odor of our PACES waste water. A sample of waste water from SIB processing was reduced in odor with this oxidizer. Even though odor is objective, I would say that it improved the odor substantially. Its use is strongly recommended as PACES.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter, Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/11/09

From: Miles Root

Lab Memo: 09-042

Subject: **Praxair Evaluation 0309-21**

A sample of ethylene glycol from Praxair, Texas City, generated by Sterling Chemical Plant in Texas City, has been evaluated for recycling. This sample is evaluation 0309-21 and is a weak ethylene glycol solution. There are approximately 800 gallons of this material available on a one- time acquisition, in totes.

This material is 16% ethylene glycol. It is near water white in appearance and without solids, particulates or sludges of any kind. It has just a faint odor of the ethylene glycol. It is good looking material. We should pursue its acquisition, charging for handling, and then remarket this as a product. This will be profitable for CES.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman, Kim Harmon
Cc: Matt Bowman, Prabhaker, Brian Weathers

Date: 3/10/09

From: Miles Root

Lab Memo: 09-041

Subject: **SW Shipyard Evaluations 0309-07 & 08**

Two samples of sulfidic caustic and two samples of spent sulfuric acid from SW Shipyard, Channelview, have been evaluated for use at PACES. These samples are evaluations 0309-07 & 08. These materials are produced from the cleaning of barges. Overall, one of the two sulfidic caustic samples has high carbonate to sulfide ratio which will not allow a good NaSH product to be produced. Both sulfuric acid samples are weak in concentration and won't add much to our processing. I don't recommend their use. Potential volume of sulfuric acid is 10,000 gallons per month. Potential volume of sulfidic caustic is 20,000 gallons per month.

Both sulfidic caustic samples have high carbonate levels as shown in the table below. We can theoretically use them as feed in the process, but we will end up producing more of a sodium carbonate vs. sodium sulfide product. The better of the two is T983 since it contains almost twice the sulfides as T504. If we can sell a mixture of carbonate/sulfides then this is not an issue. We must define our end user of this material to make a definitive call as to what our product needs to look like.

The sulfuric acid strengths of approximately 3.5% and 14% are very weak. Concentration was estimated by specific gravity. We can theoretically use them if we can make enough money from them, but they will add little value and require large volumes for our process. We are currently using around 1000 gallons of 90% concentration sulfuric acid per each batch run, so using these weaker strength solutions does not make much sense. Also, the PACES lab determines the amount of acid to use for each batch prior to its actual run. This is done using the same sulfuric acid as is done in the process. Switching acid strengths back and forth will be potentially confusing and inefficient. It is best if we can run a consistent process at PACES.

The table below summarizes the analytical testing.

SW Shipyard				
	0309-07		0309-08	
	Tank 504	Tank 983	Tank 7089	Tank 7243
Sulfuric Acid Concentration, %			3.5	14
Specific Gravity	1.04	1.06		
NaOH, wt%	5.0	9.1		
Sulfides, as S, wt%	3.5	6.8		
CO3, wt%	3.5	3.2		

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker, Al Longoria, Shannon Ward
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/09/09

From: Miles Root

Lab Memo: 09-040

Subject: **Phoenix Pollution Control Evaluation 0309-13**

A sample of waste water from Phoenix Pollution Control, via ChemQuest, Inc, has been evaluated for potential processing at CES. This sample is evaluation 0309-13 and is an off spec EDTA water solution. The potential volume of this stream is 25 totes per year. Overall, the high TOC of this material will be compensated for by the small volume we will receive. I recommend that we take this stream and discharge it at the end of our treatment process via our equalization system.

This material goes under the trade name of Dissolvine NA3-36. It is a 36-38% water solution of EDTA, a chemical commonly used as a metal scavenger in water treatment systems. This solution has a pH of 10, no phenols and essentially no metals. It has a very slight ammonia type odor and a flash point greater than 140 deg F. Its TOC is 192,600.

This water solution does not need to be treated. Since we will be receiving this material in a small quantity of totes, I'm recommending that we simply mix it in with our discharge water. At an average of 2-400 gallon totes per month this solution will be easily equalized out with our good treated water and our extra TOC will be minimal. Extra handling will be involved with this processing scheme, so include labor charges to cover these extra costs in our pricing.

The table below summarizes the analytical testing.

Phoenix Pollution Control	
Evaluation 0309-13	
Solids, vol%	0
Odor	Slight Ammonia
pH	10
Phenols, ppm	0
TOC, mg/L	192,600
Oil, vol%	0
Treatability	None Needed
Metals, ppm	
Ni	0.094
Zn	0.000
Cu	0.026
Cd	0.000

CES Environmental Services, Inc.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/06/09

From: Miles Root

Lab Memo: 09-039

Subject: **Rineco NuStar Terminals Evaluation 0309-04**

A sample of waste water from Rineco, Nustar Terminals, has been evaluated for potential processing at CES. This sample is evaluation 0309-04. This material represents water from cleaning a tank that last contained 2-methoxyethanol. The frequency of this stream is one 5000 gallon load per year. This particular stream is high in metals and will need equalization for reduction.

This material carries a D001 waste code for flash point. This particular sample does not flash below 140 deg F. The pH is 6. The treated sample has TOC of 7864 ppm and no phenols. The water is high in nickel, zinc and chromium. It will need equalization to lower these values to acceptable levels. This sample also has a very objectionable odor. It is not the odor of 2-methoxy ethanol.

I tried the sulfide treat on this stream with limited success. Either the nickel or zinc could be reduced, but not both simultaneously. Several attempts at varying pH values were tried. The pH plays an important factor in this. This is just an observation and understanding that we may not be able to sulfide treat all high nickel and zinc streams in the future.

My concern with this load is that it will come in with a flash point, even though the evaluation sample does not flash below 140 deg F. If this does happen, then equalization will be a key factor in its processing.

The table below summarizes the analytical testing.

Rineco NuStar Terminals	
Evaluation 0309-04	
Solids, vol%	0
Odor	Objectionable
pH	6
Phenols, ppm	0
TOC, mg/L	7,864
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	2.482
Zn	5.400
Cu	0.000
Cd	0.143
Cr	1.100

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Houston, TX 77021
Tel. (713) 676-1460
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To: Shannon Ward
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/4/09

From: Miles Root

Lab Memo: 09-038

Subject: **Green River Biodiesel Evaluation 0309-05**

A sample of waste from biodiesel processing has been evaluated for potential processing at CES. This sample is evaluation 0209-05. It represents waste from a biodiesel processing plant. This is a one-time stream of 70,000 – 80,000 gallons of material. Overall, this material must be brought in as a recyclable in order to recover the methanol, which is around 45%. The bottoms will go to a class 1 box.

This sample is very dark brown/black in appearance. It is liquid and contains no solids or sludges. It does not mix with our black oil or light ends. It has a flash point of less than 80 deg F due to its methanol content. Its density is 0.978.

A distillation of this material to determine the amount of recoverable methanol shows approximately 45% as wet methanol. The recovered methanol does have a slight odor of fatty acids. There is no water that comes over in the distillation once the methanol is completely over, and the temperature climbs rapidly. The pot bottoms will consists of liquid organics that will need to go to a class 1 box. No solids or sludges are formed during the distillation.

This one-time acquisition will require extensive use of our distillation unit. Operations will need to make the final call on whether or not we can accept this quantity of material for recyclable distillation.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Ramiz Tafilaj, Matt Bowman

Date: 3/4/09

From: Miles Root

Lab Memo: 09-037

Subject: **<u>Kosovo Disulfide Oil Evaluation Testing Report</u>**

Testing has been completed on the Kosovo disulfide oil receipt from December 2008. Results show material that is of high quality but one that also potentially presents environmental issues as well.

The disulfide oil from Kosovo Ministry of Environmental and Spatial Planning was tested for a variety of parameters. Testing included BTU, ash content, metals, sulfur, total acid number, specific gravity and appearance. These test data are summarized in the table below.

Of special note was the issue with odor. This material was found to be environmentally unfriendly due to odor issues. Use of this material as a fuel blend stock was only recommended in closed systems due to odor. A head space analysis of this material reveals it to contain excessive concentrations of methyl disulfide at 201.2 ppm. This level of methyl disulfide is enough to be of concern environmentally. The other large component of this testing, a dimethyl thiophenes has an odor similar to that of benzene and would not be of concern.

The methyl disulfides in this material would automatically exclude any outdoor or open type combustion due to very objectionable odors, even at this seemingly low level. Methyl disulfide is the lowest molecular weight disulfide and accounts for its overall objectionable odor as well.

Also noted was ethyl disulfide at 20.6 ppm. While not as objectionable as methyl disulfide, it too is environmentally unfriendly and would add to the objectionable odor, even at this concentration.

Hydrogen sulfide, though present at the less than 0.1 ppm level in the head space, may also be an issue. Hydrogen sulfide is deadly at low level concentrations. While its solubility in this disulfide material is unknown, it is also a very potentially dangerous component to this material, and all safety precautions must be exercised during its handling. It is also a very environmentally unfriendly potential component of this material.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

The table below summarizes the key analytical test results. Attached are test lab results for head space analysis, chlorides and metals.

Kosovo Disulfide Oil	
Evaluation Test Report Summary	
BTU/lb	18,033
Specific gravity	0.84
Appearance	Light Green
Total Acid Number,mg KOH/g	0.4
Total Sulfur, as S, wt%	24.0
Total Chlorides, ppm	6733
Ash Content, wt%	0.14
Metals, ppm	
Iron	<0.5
Sodium	<1.0
Zinc	<0.5

Respectfully submitted by

Miles Root

Miles Root

Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
Houston, TX 77021

CES Environmental Services, Inc.

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Houston, TX 77021
Tel. (713) 676-1460
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To: Ramiz Tafilaj, Matt Bowman

Date: 3/4/09

From: Miles Root

Lab Memo: 09-037

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The table below summarizes the key analytical test results. Attached are test lab results for head space analysis, chlorides and metals.

Respectfully submitted by
Miles Root
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Appearance	Light Green
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Total Chlorides, ppm	6733
Ash Content, wt%	0.14
Metals, ppm	
Iron	<0.5
Sodium	<1.0
Zinc	<0.5

Jennifer Rust

From: Nancy LaBrozzi [nlabrozzi@zimmerworldwide.com]
Sent: Tuesday, January 06, 2009 5:36 PM
To: Jennifer Rust
Subject: FW: disulfide oil analysis

To: Brandy + Matt

Importance: High

FYI

Nancy LaBrozzi
VP of Imports and Administration
Licensed Customs Broker
Zimmer Worldwide Logistics, Inc.
832 300-5904
713 854-0308 cell
832 201-7479 Fax
nlabrozzi@zimmerworldwide.com

From: Knut Scharning [mailto:knutsolo@sbcglobal.net]
Sent: Thursday, August 28, 2008 11:10 AM
To: Nancy LaBrozzi
Subject: disulfide oil analysis

This is the Product analysis on the di sulfide oil

(84)

FREE OF PARTICULATES

SPECIFIC GRAVITY(API)................... 37 – USE 56-
DENSITY 15C................................ 1.040 g/ml
BASIC SALT WATER (BSW)................ 0.6%
COLOUR.. green - LIGHT GREEN
SALANITY PTD ATO......................... 10%
BS&W 47 MAX
ACID NUMBER................................ 0.39 0.4
REID WAPOUR...PRESSURE............. 6.52 –
MAX WATER & SEDIMENT % MAX........ 0.01 WATER - < 10ppm
IRON, WT PPM................................ 1.0
VANADIUM WT PPM......................... 2.0
NICKEL WT PPM.............................. 4.0
POUR POINT.................................. BELOW 19 Degree F
SULPHUR...................................... 25.87 23.8 26....
SEDIMENT CONTENT....................... 0.14

Hopefully this will do the trick
Awaiting your firm Quote

BRGDS
Gulf Stream Tanker Chartering, Llc.
Knut A. Scharning
Phone 713 869 4657 Cell 713 291 0044 Fax 713 862 3199
Email: knutsolo@sbcglobal.net
IM Yahoo: shipknut

Client: ***CES ENVIRONMENTAL***	Report Date: 01/19/09
2420 South Gulfway Drive	Sample Matrix: Liquid
Port Arthur, TX 77641	Date Collected: 01/16/09
	Time Collected: 11:00am
Attn: ***Mr. Marlin Moser***	Collected By: Client
Phone:1-713-539-6574	Date Received: 01/16/09
Email: mmoser@cesenvironmental.com	Time Received: 12:25pm
ggbery@cesenvironmental.com	CHEMTEX FILE #: P9010516

AIHA *Laboratory* **# 101478**

nelap *certificate* **# T104704239-08A-TX**

RESULTS OF ANALYSIS

CHEMTEX #	Sample Identification	Parameter	Units	Results	MDL
P9010516	Tank 167	Total Iron	mg/l	< 0.500	0.500
		Total Sodium	mg/l	< 1.000	1.000
		Total Zinc	mg/l	< 0.500	0.500
		Chlorides	mg/l	6733	1
Method Blank	DI Water	Total Iron	mg/l	< 0.010	0.010
		Total Sodium	mg/l	< 0.050	0.050
		Total Zinc	mg/l	< 0.010	0.010

MDL: Method Detection Limit.

LABORATORY QUALITY ASSURANCE/QUALITY CONTROL DATA

LABORATORY CONTROL SAMPLE (LCS) RECOVERY

Parameter	Units	True Value	Obtained Value	% Recovery	Limits (%)
Total Iron	mg/l	1.000	0.973	97	80-120
Total Sodium	mg/l	5.000	4.587	92	80-120
Total Zinc	mg/l	0.500	0.489	98	80-120
Chloride	mg/l	200	198	99	80-120

METHOD REFERENCES/ANALYSIS DATES & ANALYSTS

Parameter	Method Reference	Date Analyzed/Analysts
Total Iron	EPA Method 6010B	01/19/09 HKR/NR
Total Sodium	EPA Method 6010B	01/19/09 HKR/NR
Total Zinc	EPA Method 6010B	01/19/09 HKR/NR
Chloride	Std. Methods 4500-Cl^-C	01/16/09 PSL

Client: ***CES ENVIRONMENTAL***
2420 South Gulfway Drive
Port Arthur, TX 77641

Attn: ***Mr. Marlin Moser***
Phone:1-713-539-6574
Email: mmoser@cesenvironmental.com
ggbery@cesenvironmental.com

Report Date: 01/19/09
Sample Matrix: Liquid
Date Collected: 01/16/09
Time Collected: 11:00am
Collected By: Client
Date Received: 01/16/09
Time Received: 12:25pm
CHEMTEX FILE #: P9010515

AIHA *Laboratory* # 101478

nelap *certificate* # T104704239-08A-TX

RESULTS OF ANALYSIS

Sample Identification: Tank 167
CHEMTEX #: P9010515

Parameter	Units	Results	MDL
Ash Content	wt %	0.14	0.01
B T U (heat content)	btu/lb	18,033	100

ppm: parts per million

MDL: Method Detection Limit

METHOD REFERENCES/ANALYSIS DATES & ANALYSTS

Parameter	Method Reference	Date Analyzed/Analyst(s)
Ash Content	ASTM D-482	01/16/09 PSL
BTU (heat content)	ASTM D-240	01/16/09 SR/PSL

Dr. C. N. Reddy, Ph.D, CIH, ASP
Director

kml*/amd/CNR

Proforma Invoice

Shipper
Kosovo Ministry of Environmental and Spatial Planning
Rruga Nazim Gaffuri Nr 31
Taslixhe Pristina Republic of Kosovo

Date:	12/15/2008
Inv. Number:	PI780412
INCOTerms:	FOB
POL:	Kumport, Istanbul
POE:	Houston, TX
Carrier:	Hoyer
Vessel:	Veracruz Express V72W

Consignee
CES Environmental Services
4904 Griggs Rd
Houston, TX 77021

BL: HLCUIS1081100211

Qty - MT	Weight	Description	USD Unit Price	USD Total
20.10	20100kg	Disulphide Oil	622.30/T	12,508.23
15.00	15000kg	Disulphide Oil	622.30/T	9334.50
18.12	18120kg	Disulphide Oil	622.30/T	11,276.07

7910.19.1013/BBL/$0.0525

Country of Origin: Kosovo

Subtotal:	$33,118.80
Tax:	$0.00
Total	$33,118.80

CES Environmental

EPAHO113001174

UOSBVD

SGS

Certificate of Analysis

(Page 1 of 1)

Client :	SGS.OGC.BFCOMMUNITY (SGS.OGC)	Report No :	161228
Product :	Not Specified	SGS File No :	128931
Client Ref :	CES ENVIROMENTAL		

LIMS No :	161228 - 493551	Lab No :	VAPOR BAG
			VAPOR BAG
Sample Description :	Sampled by Client. Received by Shipping/Receiving. Contained in plastic bag.		
Sample Label :	SX ID: 190176-001 CLIENT ID: 0109-43 REPORT TO JRUST@CESENVIRONMENTAL.COM AND KEVIN PERRY PRODUCT IS AIR SAMPLE	Tested On :	1/21/2009

METHOD	TEST	RESULT
ASTM D 5504	Sulfur in Natural Gas by sievers	
	Sulfur Speciation	See Attached

Supervisor : .... Date : 01/21/2009

Fasih Qazi

Precision parameters apply in the determination of above test results. Also refer to ASTM D 3244-97/02, IP 367/96 and appendix E of IP standard methods for analysis and testing for utilization of test data to determine conformance with specifications.

Date printed: 21-Jan-2009

SGS North America Inc. | Oil, Gas & Chemicals Services 1201 W 8th Street Deer Park TX 77536
TEL: (281) 479-7170 FAX: (281) 479-2734

SGS

Sulfur Compounds by GC and Sulfur Selective Detection

ASTM D 5504 LPG

Client: *SGS.OGC.BFCOMMUNITY* Lab No. *P4-9-3551*
Sample I.D. *CES ENVIRONMENTAL* Date: *1/21/2009*
SAMPLE ID: 190176-001
CLIENT ID: 0109-43

Sulfur Compounds	Concentration (ppm wt)	
	as compound	as sulfur
Hydrogen Sulfide *	<0.1	<0.1
Carbonyl Sulfide	0.6	0.3
Sulfur Dioxide	<0.1	<0.1
Methyl Mercaptan (Methanethiol)	2.3	1.5
Ethyl Mercaptan (Ethanethiol)	1.2	0.6
Isopropyl Mercaptan (2-Propanethiol)	<0.1	<0.1
n-Propyl Mercaptan (1-Propanethiol)	<0.1	<0.1
tert-Butyl Mercaptan (2-Methyl-2-Propanethiol)	<0.1	<0.1
sec-Butyl Mercaptan (1-Methyl-1-Propanethiol)	<0.1	<0.1
Isobutyl Mercaptan (2-Methyl-1-Propanethiol)	<0.1	<0.1
n-Butyl Mercaptan (1-Butanethiol)	<0.1	<0.1
Thiophenol(VinylMercaptan)	<0.1	<0.1
Methyl Sulfide	0.4	0.2
Carbon Disulfide *	0.3	0.3
Ethylmethyl Sulfide	0.4	0.2
Ethyl Sulfide	<0.1	<0.1
Methyl Disulfide	201.2	137.0
Ethyl Disulfide	20.6	10.8
sec-Butyl Sulfide	<0.1	<0.1
n-Butyl Sulfide	<0.1	<0.1
n-Butyl DiSulfide	<0.1	<0.1
Phenyl Sulfide	<0.1	<0.1
Thiophene	<0.1	<0.1
2-Methyl-Thiophene	<0.1	<0.1
3-Methyl-Thiophene	<0.1	<0.1
TetrahydroThiophene	<0.1	<0.1
2-Ethyl-Thiophene	<0.1	<0.1
Total DimethylThiophene	194.7	55.7
3-Ethyl-Thiophene	0.1	<0.1
Total TrimethylThiophene	0.2	<0.1
Total TetrarmethylThiophene	<0.1	<0.1
Benzo[b]Thiophene (Thianaphthene)	<0.1	<0.1
Methylbenzothiophen	<0.1	<0.1
Dimethylbenzothiophene	<0.1	<0.1
Phenylthiophene	<0.1	<0.1
Trimethylbenzothiophene	<0.1	<0.1
Tetramethylbenzothiophene	<0.1	<0.1
DIBENZOTHIOPHENE	<0.1	<0.1
Methyldibenzothiophene & Heavier	<0.1	<0.1
Unidentified Sulfur Compounds	35.2	8.4

Total Sulfur
215.0 PPM WT

SR

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Shannon Ward
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/4/09

From: Miles Root

Lab Memo: 09-036

Subject: **Omnilife USA Evaluation 0309-02**

A sample of bottled cola from Omnilife, Houston, has been evaluated for potential processing at CES. This sample is evaluation 0309-02 and is an outdated cola drink comparable to Coca Cola. This material comes in 3,405 plastic 600 mL bottles on two pallets, for a total of 540 gallons. Overall, there really is no treatment needed for this material. It will be labor intensive with the opening and dumping of 3,405 bottles, so be sure to include fees to cover this extra expense.

This material is dark brown like a regular cola. It has a pH of 2.6 and a TOC of 47,860, probably due to the sugars/sweeteners that it contains. It does not really treat like regular water in that it does not form a floc precipitant. This material has no phenols and the metals are all at acceptable levels. There is really no flash point, but it does have the peculiar property of putting out the test flame due to the release of its carbon dioxide when heated, which will not support combustion. Just a side note, but I found it to be an interesting piece of data.

This material does not need to be treated in our process but can be fed into our outfall in a small stream in order to keep our discharge pH above 5. We can dump the cola into a tote, using a funnel to sit the turned over bottles in. The tote can be discharged into one of our treated tank effluents. Again, charges should cover not only labor for dumping these 3,405 bottles, but bottle disposal and high TOC values as well. Its acquisition is recommended.

The table below summarizes the analytical testing.

Omnilife	
Evaluation 0309-02	
Solids, vol%	0
pH	2.6
Phenols, ppm	0
TOC, mg/L	47,860
Oil, vol%	0
Treatability	Poor
Metals, ppm	
Ni	0.085
Zn	0.070
Cu	0.036
Cd	0.033
Cr	0.190

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker, Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/4/09

From: Miles Root

Lab Memo: 09-035

Subject: **<u>Midtex Evaluation 0209-54</u>**

A sample of oil from Midtex has been evaluated for potential acquisition and sales. This sample is evaluation 0209-54 and is a sample of off spec 5W/20 lube oil from an oil blending a packaging facility. Potential volume of this stream is 1800 gallons.

This oil is a little cloudy in appearance. When heated, it clears up nicely. Water content is 977 ppm. Color is 3.5. It should make an acceptable base oil but we need to be able to turn it around and market it quickly, as we have several loads on hand that have yet to sell. Kim should be able to give us the most recent pricing for this type of material..

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/2/09

From: Miles Root

Lab Memo: 09-034

Subject: **Brenntag Evaluation 0309-03**

A sample of caustic from Brenntag, Houston, has been evaluated for potential use at CES/PACES. This sample is evaluation 0309-03 and represents caustic from a line flush. The potential volume of this stream is 2-4 totes per month. Overall, this caustic looks good for use at CES but is too low strength to effectively help us at PACES. Its acquisition is recommended.

This caustic has a density of 1.084, which is equivalent to 8% NaOH. The caustic value by titration is 8.3 wt%, so this is a pretty close match. This particular sample has a slight ammonia odor which Gary indicates is in one of the three totes currently available. I do not believe that this will be an issue for our use. Its main use will be pH adjustment on incoming loads as needed, tank wash, and caustic use in our waste water treatment system. Since this material will be coming to us in totes there will be minor handling issues. Charge accordingly.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker, Al Longoria
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/2/09

From: Miles Root

Lab Memo: 09-033

Subject: **Sierra Chemical (Electroless Nickel Plating) Evaluation 0209-67**

A sample of spent caustic from Sierra Chemical (Electroless Nickel Plating) has been evaluated for potential use at CES/PACES. This sample is evaluation 0209-67 and represents caustic used in a nickel plating operation. There are approximately 8400 gallons of this material available. Overall, this caustic is too weak to use at PACES and contains too high nickel content for use at CES.

Approximate nickel concentration of this sample is 10,000 ppm, or 1%. Two dilutions were used to run this sample by flame AA. Caustic strength of this sample by titration is 4.7 wt% as NaOH. This sample is too low in caustic strength to be of any value at PACES and the nickel is too high to process in our waste water at CES. Caustic strength we would like to use at PACES is a minimum 22 wt% as NaOH.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman, Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/2/09

From: Miles Root

Lab Memo: 09-032

Subject: **Dynamic Evaluations 0209-49-53**

Samples of sulfidic caustic from Dynamic at SW Shipyard have been evaluated for potential use/marketing by CES. These samples are evaluations 0209-49 thru 53 and represent material from a barge cleaning operation. Overall, this material is totally spent and should be marketed "as is. I do not have the volume availability of this material.

These five samples were composited into one sample and tested. Of the five, four are clean-looking and free of any solids and amber- orange in appearance. The fifth contains approximately 10% solids and is dark green in appearance. The material in this fifth sample can be filtered to remove the solids.

Analytical testing shows that this material is totally spent. Its sulfide content is too high to use as a feed, and we are trying to make material like this anyway. Even though the caustic strength is on the low side, we cannot make any better use of this caustic because it is totally "used up" or spent with sulfide and carbonate. We should market it "as is" on a dry tons basis of sodium plus sulfur to the paper mill industry.

Dynamic	
Evaluations 0209-49 thru 53	
Total Alkalinity, as NaOH, wt%	7.4
Sulfide, as S, wt%	5.3
Carbonates, as Na2CO3, wt%	2.0
Specific Gravity	1.077

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/2/09

From: Miles Root

Lab Memo: 09-031

Subject: **UTS Evaluations 0209-68 & 69**

Two samples from UTS, Houston, have been evaluated for potential processing or use at CES. These samples are evaluations 0209-68 and 69.

Evaluation 0209-68 represents 2-4 totes/month of sodium hydroxide and sodium salts. This material originates from the cleaning of barges containing caustic and sodium salts. This particular sample has a recoverable caustic layer of around 30%. The caustic strength of the liquid portion of this sample is 38.6%. The solids are water soluble, as they should be if they are sodium salts.

On this particular sample, the small amount of caustic we could recover could be used at CES to pH adjust our water along with the lime. It is not worth the transportation costs to deal with 100 or so gallons of caustic to go to PACES. Also, this strength of caustic may or may not be representative of anything we will see in the future. The sludge has a pH of 11.8 and could be put into a class 2 sludge box.

Again, future receipts may not look anything like this material so an alternate plan would need to be in place. For instance, the solids could be dissolved in excess water and treated like waste water. Large amounts of acid would be consumed to pH adjust the material along with excessive heat formation, but it could be done.

Evaluation 0209-69 represents 2-4 totes/month of oily caustic sludge. The pH of a 1:1 mix of this material and water is 13.5. We can only recover this oil through a centrifuge process along with heat. Currently, we do not have a centrifuge system in place to handle this type of material. Heat alone does nothing to break out this emulsion. Our current option is to move this material into a sludge box. Outside testing would need to be performed for a profile of this material to be done, unless other information is available. Disposal is our only current option as I do not see any way we can recycle it.

Overall, we can currently handle the caustic with solids, evaluation 0209-69, and potentially dispose of the oily caustic sludge, evaluation 0209-68, with additional information or outside lab testing. When our centrifuge along with heat tank is set up at PACES, then recycling will be an option.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman, Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 3/2/09

From: Miles Root

Lab Memo: 09-030

Subject: **FlowChem Evaluations 0209-56 - 64**

A group of ten samples from FlowChem, Blinka Rd, have been evaluated for potential processing at CES. These samples are evaluations 0209-56 thru 64. They represent material from ten different totes of undetermined volumes. Overall, the organic portions of these materials are best handled as a blend and sold into a fuels market. The aqueous portion can be handled as waste water at CES. We must make sure that we can market the organic portion of this material before moving forward, as it cannot be blended into our oils.

These samples will all carry a D001 code for their low flash, which is less than 80 deg F. A few of the totes have two layers. These secondary bottom layers are either aqueous or solids/emulsions. A few of these totes contain a polymer type compound, which in this case means that they are stringy. A composite of the organic phase all totes shows a BTU value of 15,122. The composite blend is stringy and has the characteristics of a polymer.

We do not want to bring these materials into CES for blending with our oil products, as they will give an uncharacteristically stringy nature to our oil. A composite of all samples will produce a bottom aqueous layer that can be treated. Treatment produces numerous solids but they do settle out adequately. This treated water has no phenols, low TOC and acceptable metals.

An overall plan for these materials is to composite into one trailer. Remove the bottom aqueous layer that will contain some sludge and solids. It's difficult to judge just how much volume of aqueous material there is, but it should be less than 20% of the entire volume. The top organic portion should be marketed for fuels, but not a fuel to blend with our oil products, as it will cause it to be stringy from the polymer. Let's make sure that we can market this material before moving forward, as this material cannot be blended into our oils. We are not talking about a lot of material, possibly 2500 gallons of fuels material.

The table below summarizes the types of material each tote represents. Also included is an analytical summary of the treated water.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

FlowChem		
Evaluations 0209-56-64 Summary		
Tote Number	Phases/comments	Nature of Material
2	1	Polymer
3	2	Polymer with aqueous
6	1 with solids	Non Aqueous
9	1	Non Aqueous
15	1 with solids	Non Aqueous
16	2 with solids	Non Aqueous Top
23	2 with silt	Polymer top
20	2 with emulsion	Polymer top
34	1	Non Aqueous
38	2 with silt	Non Aqueous top

FlowChem	
Evaluations 0209-56-64 Aqueous	
Phenols, ppm	0
TOC, mg/L	2,040
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	0.167
Zn	0.041
Cu	0.005
Cd	0.056
Cr	0.000

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Shannon Ward
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 2/27/09

From: Miles Root

Lab Memo: 09-029

Subject: **Kinder Morgan Evaluation 0209-37**

A sample of water from Kinder Morgan has been evaluated for potential processing at CES. This sample is evaluation 0209-37. This evaluation represents material from a cumene tank bottoms. The available quantity of water is around 400 gallons. Overall, this water contains no cumene and is an easy water to handle and treat at CES.

This sample contains mostly solids, scale and rust, with a water layer. These will be disposed of off-site and are not an issue with CES This water has a pH of 7 and a flash point greater than 140 deg F. The water treats easily and forms a nice large floc that quickly phase separates out. The TOC is only 104 ppm with 1 ppm phenol. Metals are all at acceptable levels. This small amount of water may be brought in and mixed with any other of our process waters for treatment with no issues.

The table below summarizes the analytical testing.

Kinder Morgan	
Evaluation 0209-37	
pH	7
Phenols, ppm	1
TOC, mg/L	104
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	0.505
Zn	0.205
Cu	0.080
Cd	0.080
Cr	0.215

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 2/25/09

From: Miles Root

Lab Memo: 09-028

Subject: **<u>Afton Port Arthur Evaluations 0209-32 & 35</u>**

Two samples of a methacrylate from Afton, Port Arthur have been evaluated for potential processing at CES. These samples are evaluations 0209-32 and 35. Evaluation 0209-32 is a solid from a product tank and 0209-35 is the methacrylate product. Overall, we should pass on trying to process or use any of this material at CES.

This material is called lauryl methacrylate, a monomer commonly used in paints, coatings, plasticizers and even lubricating oils. The lauryl prefix is just another term for dodecyl or twelve carbons in this molecule. The solids from this tank are almost certainly the result of this material having polymerized over time, creating this gelatinous type of material. While this methacrylate will blend with oils and light ends, it is for this very reason of its polymerization characteristic that we should not use it in those products.

Though there is less than 1000 gallons of this material, the fact that it can polymerize in our products should keep it out of our products. The gelatinous solids indicate that it has already begun that process. If it can be moved into a market that will use it "as is" that would be a best fit solution.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 2/25/09

From: Miles Root

Lab Memo: 09-027

Subject: **Ashland Water Tech Evaluation 0209-48**

A sample of waste water from Ashland Water Tech, Houston, has been evaluated for potential processing at CES. This sample is evaluation 0209-48 and is water from plant and equipment wash down. The potential volume of this stream is 4-6 2000 gallon loads per year with a once per year heavy solids clean out. The issue with this material is that the flash point is only 120-125 deg F. This is not a recyclable stream.

This sample contains approximately 30% solids, but only the water phase was tested for this work, as per Gary's instructions. The water phase has 4% solids by centrifuge. This water is green in appearance and when treated, changes to a milky pink. I know there are no specs on water appearance, but I'm just reporting any observations that are unusual. There are more than typical amounts of solids formed when treated, but this is not a real issue with this stream.

The incoming water has a pH of 7. The treated water has phenols of 5 ppm and a TOC of 7895 ppm. The low TOC is a good indicator that the component in solution giving a low flash point is present in only a small quantity. Gary has indicated that Ashland may legally treat this water, so a simple application of heat may resolve the flash point issue. If the flash point issue can be resolved, we will be able to accept this stream for processing at CES.

The table below summarizes the analytical testing.

Ashland Water Tech	
Evaluation 0209-48	
Solids, vol%	4
Flash point, deg F	120-125
pH	7
Phenols, ppm	5
TOC, mg/L	7,895
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	0.465
Zn	2.589
Cu	0.484
Cd	0.060
Cr	0.000

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 2/25/09

From: Miles Root

Lab Memo: 09-026

Subject: **Environmental Disposal Solutions Evaluation 0209-45**

A sample of waste water from Environmental Disposal Solutions (formerly Evergreen), generated by Valero, Houston, has been evaluated for potential processing at CES. This sample is evaluation 0209-45 and is organic skimming from waste water treatment. The potential volume of this stream is one load per month. It carries a D018 code for benzene. Overall, the organic phase of this material may be recycled into our light ends and the water processed and discharged with minimal issues.

This stream contains approximately 3% organics in an aqueous caustic medium that contains 2% of fine silty solids. The pH is 11. The flash point of this stream is between 140 and 145 deg F. Our standard heat and acid treat of this material will give a good phase separation of the organics. While not an emulsion, this treatment does bring out all of the entrained hydrocarbons. I would put these hydrocarbons into our light ends, into which they blend without issue.

The water phase treats okay with typical solids formation. TOC is on the higher side at 16,490 ppm. Phenols are 5 ppm, an acceptable level, and all metals on the treated water are at an acceptable level. This should be a fairly easy stream to handle with minimal issues.

The table below summarizes the analytical testing.

Environmental Disposal Solutions	
Evaluation 0209-45	
Solids, vol%	2
pH	11
Phenols, ppm	5
TOC, mg/L	16,490
Oil, vol%	3
Treatability	OK
Metals, ppm	
Ni	0.679
Zn	0.396
Cu	0.043
Cd	0.090
Cr	0.389

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker, Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 2/24/09

From: Miles Root

Lab Memo: 09-025

Subject: **Afton Port Arthur Evaluation 0209-34**

A sample of oil additive from Afton, Port Arthur, has been evaluated for potential marketing by CES. This sample is evaluation 0209-34, and is a product HiTec 7050 that is off spec in color due to overheating. This very high viscosity material is best sold "as is" into the marketplace. The approximate 40,000 gallons of this material is currently in railcars.

This material has a color of 7, only 227 ppm water, and an API gravity of 25. The viscosity @ 100 deg C is 175 cSt. This is very viscous material and would take a long time to blend away into our black oil. It is best marketed as a product. If this material needs to be moved via truck, operations will need to use a heated trailer due to its high viscosity, and keep this material hot. The cleaning of all the vessels that are used in this transaction will all need extra handling to insure that they are clean afterwards.

The table below summarizes the analytical testing.

Afton, Port Arthur	
Evaluation 0209-34	
Color, ASTM D1524	7
Water, ppm	227
Viscosity @ 100 deg C, cSt	175
API gravity	25

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 2/23/09

From: Miles Root

Lab Memo: 09-024

Subject: **BJ Services Evaluation 0209-40**

A sample of waste water from BJ Services at Aldine Westfield, have been evaluated for potential processing at CES. This sample is evaluation 0209-40. This is a new source of water from BJ Services and the exact frequency is unknown, but it could be one or two loads per month. Its acquisition is highly recommended.

This sample foams like soap when shaken, so it could be from a cleaning operation. Since the TOC is low it's probably a phosphorous based detergent. The pH of this water is 10 and it has no solids. The water treats easily but forms an above average amount of dense solids that will take a longer than typical amount of settling time. We can live with this and it is not a real concern, just an observation. The TOC on the treated water is only 2454 ppm and the metals are all at an acceptable level. We should pursue the acquisition of this water as it will be a benefit to our plant processing at this time.

The table below summarizes the analytical testing.

BJ Services	
Evaluation 0209-40	
Solids, vol%	0
pH	10
Phenols, ppm	1
TOC, mg/L	2,454
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	1.126
Zn	0.066
Cu	0.092
Cd	0.065
Cr	0.003

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 2/23/09

From: Miles Root

Lab Memo: 09-023

Subject: **Afton Port Arthur Evaluation 0209-36**

A sample of laboratory waste from Afton, Port Arthur, has been evaluated for potential recycling at CES. This sample is evaluation 0209-36 and represents four drums of product sample along with solvents used to clean our containers. Overall, this material looks to be a good fit for blending with our light ends. It will be a recyclable product.

This material is said to contain toluene, hexane, IPA and a product called HiTec 5700. It has a flash point less than 90 deg F, which is consistent with the solvents it is stated to contain. It blends well with our light ends. This material is free of any solids and looks like it may have been an oil additive when new. It is dark amber in appearance and should present no issues when blended into our light ends.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker, Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 2/23/09

From: Miles Root

Lab Memo: 09-022

Subject: **EMA Evaluation 0209-24**

A sample of potassium hydroxide from EMA, Baton Rouge, has been evaluated for potential use in our sulfidic caustic business. This sample is evaluation 0209-24 and represents potassium hydroxide from a scrubber operation. Potential volume of this material is four loads per month. Overall, this material should work fine in a paper mill for pH adjustment in a waste water treatment system.

This material is fairly clean looking material. It is pale yellow-green in appearance with a cloudy haze. It does have an objectionable odor due to its mercaptans. This material by titration is 25.1% KOH. It also contains mercaptans at 0.8 wt%, as sulfur. There are no sulfides. Density is 1.221 at ambient temperature, which equates to 24% KOH at 20 deg C.

This type of material will be good for paper mills to use in the pH adjustment of their water. Our recent visit to MeadWestvaco's mill in Evadale confirms this. We should move it into this type of market. Odor will not be an issue since this strong solution will be diluted down considerably in its use.

The table below summarizes the analytical testing.

EMA Baton Rouge	
Evaluation 0209-24	
KOH, wt%	25.1
Sulfide, as S, wt%	0
RSH, as S, wt%	0.83
Density, ambient	1.221
Appearance	pale yellow green

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 2/20/09

From: Miles Root

Lab Memo: 09-020

Subject: **Rineco Nustar Terminals Evaluation 0209-30**

A sample of solvent/waste water from Rineco, Nustar Terminals, has been evaluated for potential processing at CES. This sample is evaluation 0209-30 and is material from the tank cleaning of a pure product loaded into a dirty trailer. This one time load contains isobutyl acrylate and residues along with some fuel oil. Overall, we can process this material to recycle the solvent material and successfully treat the remaining water.

Isobutyl acrylate is an ester with only slight water solubility. It is highly flammable and reacts with acids. When this trailer arrives the top phase will contain the isobutyl acrylate in oil. If it is not phase separated upon arrival, just let it sit a while. My laboratory sample phase separated with one hour after vigorous mixing. The trailer will contain some sludge/solids that we will most likely be able to remove into a sludge box. My test sample had 4% sludge which I treated successfully with the water.

The top organic phase mixes with our light ends, but not black oil. The water phase will need to go through standard water treat. The water treats okay. TOC is high at 20,710 ppm. We will want to cover our city charges on this. Phenols are 5 ppm, totally acceptable, and the metals are all at acceptable levels as well. This material will come in with a D001 code for the low flash point of the acrylate. Make sure the trailer is properly grounded before sampling.

The table below summarizes the analytical testing.

Rineco Nustar Terminals	
Evaluation 0209-30	
Solids, vol%	4
Flash Point, deg F	80-90
pH	7
Phenols, ppm	5
TOC, mg/L	20710
Organic phase, vol%	12
Treatability	OK
Metals, ppm	
Ni	0.509
Zn	0.087
Cu	0.093
Cd	0.119
Cr	0.439

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 2/20/09

From: Miles Root

Lab Memo: 09-021

Subject: **Dana Container Evaluations 0209-26 & 27**

Two samples of oil from Dana Container have been analyzed for potential sales by CES. These samples are evaluations 0209-26 & 27. This material represents the top and bottom samples taken from an iso container and represents approximately 3500 total gallons. It is reported to be a mixture of base oil and diesel. Overall, the top portion of this tank has material that is suitable as base oil while the bottoms sample is best dealt with in a sludge box.

This material does not have an odor of base oil and diesel. The top and bottom phase are not compatible with one another. It is very possible that two totally separate materials were placed into this container. The top sample, evaluation 0209-26, looks like base oil. It blends well with our black oil and is soluble in toluene. Solubility in toluene tells me that this is a petroleum based material that should mix with oil. This phase has an API gravity of 32, water content of 1317 ppm and a color of 4.5.

The bottom phase blends fairly well with our black oil but the mixture becomes very thick. There is a small portion that does phase separate upon centrifuging. Given enough time, this portion would phase separate out from the black oil. The bottom sample is also very sticky. It could be some type of oil additive, but that is unknown. The top and bottom phase when mixed form an emulsion which never really separates out, even with heating. This leads me to believe that this is not really the top and bottom of one product, but rather one material that was just dumped on top of another product. The bottom layer is only partially soluble in toluene, and leaves a very sticky substance behind. The flash point of the bottom phase is greater than 140 deg F.

I do not know the ratio of the good top phase to the bad bottom phase. We can use the top, but not the bottom. Without further information, I recommend we charge for disposal of the entire load via a sludge box. Any good recovered top oil can be used in our base oil market. From the information given, that may only be one foot of product. To get our best value from this load, we cannot mix the top and bottom phases together, as this will cause an emulsion to form. Moving this to a sludge box will be very labor intensive, so charge accordingly.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

The table below summarizes the analytical testing.

Dana Container		
Evaluations 0209-26 & 27208-48 & 49		
	0209-26	0209-27
Color	4.5	
Water, ppm	1317	
API Gravity	32	
Specific Gravity	0.865	
Chlor-d-tect, ppm	500	
Flash Point, deg F		>140
Solubility in toluene	Yes	Partial

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman, Kim Harmon
Cc: Matt Bowman, Prabhaker, Joe Camp, Clint Hopkins

Date: 2/20/09

From: Miles Root

Lab Memo: 09-019

Subject: **Syntech Evaluation 0209-28**

A sample of waste water from Syntech, Houston, has been evaluated for potential processing at CES. This sample is evaluation 0209-28 and is plant wash down water. Potential volume of this stream is approximately 4 loads per week. Overall, this water may be treated at CES with minimal issues. High TOC needs to be accounted for in pricing.

This water treats with minimal issues. The pH is on the low side at 2.2, but still not low enough to give it a hazardous characteristic. Flash point is greater than 140 deg F. Metals are all acceptable. This water has a very distinctive odor but is not particularly offensive. TOC is 15,850 ppm, and is on the high side to where we need to cover our charges from the city with our pricing.

The table below summarizes the analytical testing.

Syntech	
Evaluation 0209-28	
Solids, vol%	1
Flash Point, deg F	>140
pH	2.2
Phenols, ppm	0
TOC, mg/L	15,850
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	0.446
Zn	0.087
Cu	0.142
Cd	0.165
Cr	0.051

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman, Kim Harmon
Cc: Matt Bowman, Gary Peterson, Prabhaker,
Joe Camp, Clint Hopkins

Date: 2/11/09

From: Miles Root

Lab Memo: 09-018

Subject: **Hydrocarbon Engineering Evaluation 0209-22**

A sample of black oil from Hydrocarbon Engineering, Mississippi, has been evaluated for potential sales by CES. This sample is evaluation 0209-22 and is recovered product oil. Overall, this is good black oil that will go into our black oil market. There are approximately 1000 barrels of this material in a tank in Mississippi.

This black oil has a chlor-d-tect of 700 ppm, which is a good low value. Its flash point is 80 deg F. Water content is low at 1527 ppm. API gravity is 28, or specific gravity of 0.888. The ash content is 0.55 wt%. This is good looking oil.

The table below summarizes the analytical testing.

Hydrocarbon Engineering	
Evaluation 0209-22	
Chlor-d-tect	700
Flash Point, deg F	80
API gravity	28
Specific Gravity	0.888
Water, ppm	1527
Ash, wt%	0.55

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman, Kim Harmon
Cc: Matt Bowman, Gary Peterson, Prabhaker,
Joe Camp, Clint Hopkins, Sam Brown

Date: 2/1109

From: Miles Root

Lab Memo: 09-017

Subject: **Endigen Evaluation 0209-08**

A sample of off hydrocarbons from Endigen, Houston has been evaluated for potential sales by CES. This sample is evaluation 0209-08, and is off spec gasoline blend. This material has already been sold by Kim Harmon. It will be coming into our plant, sampled and tested and then sold. We will have a total of approximately 18,000 gallons of this material

This sample is amber in appearance and tests to have no water. It is not miscible with water. The API gravity is 44, or specific gravity of 0.805 and it has a flash point less than 80 deg F. A spot check of the specific gravity along with water and appearance should be sufficient for this material when it arrives.

The table below summarizes the analytical testing.

Endigen	
Evaluation 0209-08	
Solids, vol%	0
Flash Point, deg F	<80
API gravity	44
Specific Gravity	0.805
Water, wt%	0
Appearance	Amber

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Gary Peterson, Prabhaker, Joe Camp, Clint Hopkins

Date: 2/9/09

From: Miles Root

Lab Memo: 09-016

Subject: **Vam-US Evaluation 0209-15**

A sample of waste water from Vam-USA has been evaluated for potential processing at CES. This sample is evaluation 0209-15 and represents approximately 350 gallons of wash down water from a sump. Overall, this water has no issues and may be sent neat or blended with other waters coming from this supplier.

This water is clean looking with no oils or solids. It treats easily and has low metals, TOC and no phenols. There are no issues with this water and it may be brought in and processed. A summary of the test results is summarized in the table below.

Vam-USA	
Evaluation 0209-15	
Solids, vol%	0
pH	7
Phenols, ppm	0
TOC, mg/L	780
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	0.174
Zn	0.049
Cu	0.000
Cd	0.047
Cr	0.000

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker, Al Longoria
Cc: Matt Bowman, Gary Peterson, Prabhaker,
Joe Camp, Clint Hopkins

Date: 2/9/09

From: Miles Root

Lab Memo: 09-015

Subject: **QPL Evaluations 0209-10-11**

Two samples from QPL, Thibodaux, LA, have been evaluated for potential processing or recycling at CES. These samples are evaluations 0209-10 and 11.

Evaluation 0209-10 is a two phased sample of water and hydrocarbon. The density of the hydrocarbon is 0.9. The hydrocarbon does mix with our black oil or light ends. It has a flash point of less than 80 deg F. Recycling this phase is our best choice.

The water phase has a flash point less than 80 deg F. It has a pH of 1.3. The water does treat and forms a considerably greater amount of solids than typical. For pricing I would assume that the entire aqueous phase will need to be filter pressed. The TOC on the treated water is 120,200 ppm. The treated water is very high in both zinc and chromium, with a 12 and 2 ppm respectively. This water has obvious issues. It's not good water for processing at CES, and the flash point does not allow it to be moved to System 1. Unless we can show that it contains alcohols, we do not have a cheap alternative for this water.

Evaluation 0209-11 is a two phase sample. The density of both phases is identical at 0.86. The bottom phase is miscible with black oil or light ends. The top phase is not miscible with water, black oil or light ends. It is approximately 13% of the sample. These are two unknown organics. The top phase will need disposal, the bottom has a potential for recycle.

Volumes of the above streams are unknown. There is no paperwork identifying either the process or chemicals we are dealing with in both of these streams. More information will be needed in order for operations to make a final decision on the desirability of these streams.

The two tables below summarize the analytical test results for these two streams.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

QPL	
Evaluation 0209-10	
Flash Point, deg F, Water	<80
Solids, vol%	1
pH	1.3
Phenols, ppm	5
TOC, mg/L	120,200
Hydrocarbons, vol%	60
Treatability	High solids
Metals, ppm	
Ni	0.445
Zn	12
Cu	0.590
Cd	0.100
Cr	2.223

QPL	
Evaluation 0209-11	
Top organic phase	
Density, mg/l	0.86
Volume % of Sample	13
Miscible with black oil	No
Miscible with light ends	No
Miscible with water	No
Bottom organic phase	
Density, mg/l	0.86
Miscible with black oil	Yes
Miscible with light ends	Yes

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Gary Peterson, Prabhaker, Keld Anderson, Brian Weathers, Kim Harmon

Date: 2/5/09

From: Miles Root

Lab Memo: 09-014

Subject: **Flint Hills Evaluation 0209-05**

A sample of sulfidic caustic from Flint Hills, Corpus Christi, East Plant, has been evaluated for potential use at PACES. This sample is evaluation 0209-05, and is spent caustic from a gas scrubbing unit. The potential volume of this stream is one load/week, increasing to two loads/week during the summer months. Overall, this material looks like a prime candidate for direct sales to paper mills.

This material is very high on the clean looking scale, with just a few black particulates that settle to the bottom of the sample jar over two days time. The caustic value is good at almost 22%. This material is high in both sulfides and carbonates. It tests to contain no mercaptans, which is good, but also unusual. It is already 72% spent, so it is not a good candidate for our CES NaSH product tank. I'm guessing that the inorganic chlorides are low in this material, as refineries just dilute down 50% caustic for this use, and use pretty good material. We can have it tested if need be.

Kim, see if you have an outlet for this material currently, as it is should be good material to move into paper mills green liquor make-up. Gary/Matt, cost this out for at least $0.50/gallon plus transportation. Refineries don't really want to handle small loads like this and we will be providing a good service to handle if for them.

The table below summarizes the test results.

Flint Hills	
Evaluation 0209-05	
NaOH, wt%	21.9
Sulfide, as S, wt%	4.6
Mercaptans, as S. wt%	0
Carbonates, as Na2CO3, wt%	26.9
% Spent	72
Other Comments:	
This is a type of material that we can hopefully sell direct to paper mills. Clean looking and spent with only sulfide and carbonate.	

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Matt Bowman, Gary Peterson, Prabhaker, Keld Anderson, Brian Weathers

Date: 2/5/09

From: Miles Root

Lab Memo: 09-013

Subject: **Conoco Phillips Evaluation 0109-67**

A sample of sulfidic caustic from Conoco Phillips, West Lake, LA, has been evaluated for potential use at PACES. This sample is evaluation 0109-67, and is spent caustic from an LPG unit. The potential volume of this stream is four loads per day. Overall, this stream is best used as NaSH product tank material, only after filtered.

This material looks as though it is tank bottoms material as it has sludgy oils entrained with the caustic. In order for it to be used in our product NaSH tank it must be clean looking. Filtration is an option, but not at the expense of CES. If Conoco Phillips would like to filter this material or have us filter it at their site for a nice price, then that is okay. If not, then this material is not a consideration for that use. From what I have seen, we have other options for caustic that look more desirable.

The material does not contain sufficient sulfides to make it a good feed material. Any use as a feed would mean that it must still be filtered beforehand, as we have enough sludge already, and then diluted and acidified with weaker caustic streams. Again, with the right pricing, this could be a consideration.

Matt, whatever pricing we currently use for taking sulfidic caustic, this should be considerably higher. As a side note, even Merichem will not take this type of material due to the oily sludge it contains. I remember when working there that this type of material was very hard to move anywhere, and if we got it in, by accident, we had to dilute it considerably. We do not have that option, and like I said above, there is better looking caustic out there.

Conoco Phillips	
Evaluation 0109-67	
NaOH, wt%	26.3
Sulfide, as S, wt%	0.74
Mercaptans, as S. wt%	1.16
Carbonates, as Na2CO3, wt%	3.9
% Spent	16
Other Comments:	
Sample has oily sludge that must be removed before	
it may be used. Material can be filtered in lab with	
standard glass filter paper.	

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker, Shannon Ward
Cc: Matt Bowman, Gary Peterson, Prabhaker,
Joe Camp, Clint Hopkins

Date: 2/2/09

From: Miles Root

Lab Memo: 09-012

Subject: **<u>EnviroSolutions Evaluation 0109-69</u>**

Three samples of oil from EnviroSolutions have been tested to determine suitability for potential acquisition and sales. These samples are evaluations 0109-69 A-C. They each represent two potential loads of material. Samples were tested for API gravity, color, water and viscosity at 40 deg C. All of these samples look good, with the mineral oil the best looking. We may pay around $0.50 gallon for this particular mineral oil.

The test results are summarized in the table below.

EnviroSolutions			
Evaluation 0109-69			
Analytical Testing Summary	0109-69A	0109-69B	0109-69C
	Base Oil	Mineral Oil	Line Flush
	QPM 2025	QPM 2026	QPM 2027
API gravity	33	29	30
Viscosity @ 40 deg C, cSt	45	9	80
Color	1	2	6
Water, ppm	0	0	23

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Matt Bowman, Gary Peterson, Prabhaker,
Joe Camp, Clint Hopkins

Date: 2/2/09

From: Miles Root

Lab Memo: 09-011

Subject: **Flowchem Evaluation 0109-56**

Four samples from Flowchem have been tested for BTU and flash point. These samples are evaluation 0109-56 A-D. The information on the sample bottles indicates that these are different totes of material. No other information is given. The data is presented in the table below.

Flowchem		
Evaluation 0109-56 A-D		
Sample	BTU/lb	Flash Point deg F
0109-56A Tote 50	2290	<80
0109-56B tote 51	14155	<80
0109-56C Tote 52	14,376	>140
0109-56D Tote 53	2863	<80

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Gary Peterson, Prabhaker,
Joe Camp, Clint Hopkins

Date: 1/28/09

From: Miles Root

Lab Memo: 09-010

Subject: **Rineco-NuStar Terminals- Evaluation 0109-59**

A sample of waste water from Rineco, generated by NuStar Terminals, has been evaluated for potential processing at CES. This sample is evaluation 0109-59 and is oily water generated from the washout of storage tanks last containing VGO (vacuum gas oil). The potential volume of this source is three tankers per year. Overall, we can recycle the oil, process the water and move the paraffins into a sludge box.

This material has water and oil phases with chunks of wax interspersed throughout. The entire load will most likely need to be filtered. Pumping through a filter screen may be the best bet as a regular sock filter will plug quickly. The wax or paraffins can be disposed of in a sludge box. I estimate the oil in this sample to be no more than 10%.

The water does treat but produces around 40% solids. The solids that are formed do not readily phase out. Given enough time, the solids will phase separate out, so only the solids will need to go through the filter press and not the entire load. The treated water has acceptable metals, no phenols and a TOC of 6749 ppm. A chlor-d-tect on the oil shows 2000 ppm, so we will need a rebuttal to accept this oil.

This will not be an easy stream to recyle and the paraffins will need disposal. The entire load may need filtration to remove the paraffins as they do not separate out in this mix. We need to take these issues into account when pricing. The table below summarizes the analytical testing.

Rineco - NuStar Terminals	
Evaluation 0109-59	
Solids, vol%	0
pH	7
Phenols, ppm	0
TOC, mg/L	6,749
Oil, vol%	10
Treatability	40% solids
Metals, ppm	
Ni	0.234
Zn	0.077
Cu	0.062
Cd	0.043
Cr	0.000

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Gary Peterson, Prabhaker,
Joe Camp, Clint Hopkins

Date: 1/28/09

From: Miles Root

Lab Memo: 09-009

Subject: **Rineco-Conoco Phillips Specialty- Evaluation 0109-58**

A sample of waste water from Rineco, generated by Conoco Phillips, Specialty, has been evaluated for potential processing at CES. This sample is evaluation 0109-58 and is out of date or off spec material. Potential volume of this source is one truck per week. Overall, this material really does not treat very well as we are used to seeing, but it can be processed. I recommend its acquisition.

This material goes under the trade name of Extreme Power, and the MSDS sheet indicates that it is used as a flow improver. This MSDS also indicates that this material may contain 10-40% ethylene glycol. In addition it contains sodium lauryl sulfate, a detergent and foaming agent used in many shampoos, long chain alcohols and 52-87% other proprietary or non hazardous additives (including water). This particular sample does not contain a large amount of ethylene glycol, as it at least can go through the water treat without forming basically all solids. The water treat for this sample generates at least 60% solids with the treated water having the appearance of milk. There are no phenols in the treated water, and the nickel and zinc are extremely low. TOC is 28,580 on this sample, which indicates to me that it contained very little ethylene glycol.

We don't have an appearance spec on our treated water. This particular water, as stated above, is most likely low in ethylene glycol and not at the upper 40% level. We can use this water for "equalization" with high metals water, but may pay the price of having high solids to filter press. If the price is right, this stream could still make us some money. With a volume of only one truck per week I'm sure we could find a home for it here and process it.

The table below summarizes the analytical testing.

Rineco - Conoco Phillips	
Evaluation 0109-58	
Flash Point, deg F	>140
Solids, vol%	0
pH	4
Phenols, ppm	0
TOC, mg/L	28,580
Oil, vol%	0
Treatability	60% solids
Metals, ppm	
Ni	0.105
Zn	0.000

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Gary Peterson, Prabhaker,
Joe Camp, Clint Hopkins

Date: 1/28/09

From: Miles Root

Lab Memo: 09-008

Subject: **Rineco-Toyota Plant- Evaluation 0109-54**

A sample of waste water from Rineco, generated at a Toyota plant, has been evaluated for potential processing at CES. This sample is evaluations 0109 -54 and is water that is generated from a painting operation. Total volume of this source is estimated at five- 550 gallon totes per month initially to potentially 5000 gallons per week. Overall, this material may be processed with just a bit of extra handling to account for the potential flash point this material has.

This material looks and smells like water used to clean up after a painting operation. This particular water has a purplish tint but I would imagine that we could receive a multitude of colors. It has a flash point between 135 and 140 deg F. This particular sample would require just a dilution with any of our regular water, and a 1:1 dilution would be more than sufficient to eliminate its flash point below 140 deg F. Hopefully this material is truly representative of material we would receive. The solids on the neat sample are 8% by centrifuge method.

This material treats okay but produces a considerable amount of solids that do not readily phase out. This characteristic may require most of these loads to be filter pressed once they are treated. Let's account for this in the pricing. The treated water is clean looking and loses its paint color. The water has acceptable metals, no phenols, and 12,340 ppm TOC.

I recommend that we pursue the acquisition of this source and charge accordingly to account for the high solids both that come in with the load along with the high solids that it will generate and the additional manpower costs associated with filter pressing most of the treated water. This water will most likely routinely need to be diluted with "good" water to eliminate its low flash point potential.

The table below summarizes the analytical work on this sample.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Rineco - Toyota Plant	
Evaluation 0109-54	
Flash Point, deg F	135-140
Solids, vol%	8
pH	8.9
Phenols, ppm	0
TOC, mg/L	12,340
Oil, vol%	0
Treatability	High solids
Metals, ppm	
Ni	0.482
Zn	0.291
Cu	0.548
Cd	0.052
Cr	0.000

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Gary Peterson, Prabhaker, Joe Camp, Clint Hopkins

Date: 1/26/09

From: Miles Root

Lab Memo: 09-007

Subject: **Southcoast Terminals Evaluations 0109-45/46**

Two samples of oily water from Southcoast Terminals off Wallisville Rd, have been evaluated for potential processing at CES. These samples are evaluations 0109-45 and 46. Of the two samples, one is oil and the other is oily water. We can take the oil and mix with our black oil and treat the water. I have concerns that these samples are not truly representative of what we may actually receive from this source. Approximate total volume is estimated to be around 13,000 gallons on this one time event.

This material is a resample of material that I looked at a few weeks ago, evaluation 0109-34. These two samples are supposed to be a top and bottom tank sample. Both samples have sludges that phase separate out upon standing. A stagnant tank cannot have a sludge that phase separates out upon standing, as the tank is already just standing. That is my first concern.

The Southcoast sample I looked at a couple of weeks ago from this tank was essentially an oil emulsion that contained a significant amount of oily sludge that I could not treat. This sample eventually phased separated into three distinct layers. The oil that did phase separate out was okay and was essentially black oil. The chlor-d-tect was 1100 ppm. The middle emulsion and bottom layers were sludgy silt that would not respond to any type of heat, acid or emulsion breaker treatment, including the Dr. Sam's treat. This would need to go out in a solids box.

This current oil sample, evaluation 0109-45, has a chlor-d-tect of 1000 ppm, which is at the top of the acceptable limits. It blends well without issues into our black oil. Heat and acid will be required to phase separate out the water, evaluation 0109-46, which is standard practice. The treated water that is separated out does produce a very high solids content, 50% in this case. That solids content was measured by centrifuge spin out once the treat was complete.

Overall, the two samples that this evaluation represents look okay, but we need to verify that we will not be receiving anything other than this type of material. If so, there will be major processing issues. I recommend samples taken from whatever sample spigots there are on this tank in order to determine what is actually in this tank and how much.

With black oil selling for only around $.25/gal, we for sure don't want to pay for this material. We do not know the volume of oil vs. water in this tank. The processing of the water may require that the entire load be filter pressed. These are concerns that I have, and pricing needs to cover our costs.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

A summary of the analytical testing is found in the table below.

Southcoast Terminals		
	0109-46	0109-45
Solids from water treat, vol%	50	
pH	8	
Phenols, ppm	0	
TOC, mg/L	9,503	
Oil, vol%	8	100
Chlor-d-tect, ppm		1000
Treatability	High Solids	
Metals, ppm		
Ni	0.825	
Zn	0.900	
Cd	0.110	
Cu	0.046	
Cr	1.000	

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Gary Peterson, Prabhaker,
Joe Camp, Clint Hopkins

Date: 1/26/09

From: Miles Root

Lab Memo: 09-006

Subject: **Rineco Evaluation 0109-48**

A sample of waste water from Rineco has been evaluated for potential processing at CES. This sample is evaluation 0109-48, and is a sample of waste water generated by Schlumberger Technology, North. This water results from the washing of equipment. The potential volume of this stream is one or two vacuum trailers per month. Overall, this water can be processed at CES with minimal effort and should be considered good water for treatment. Its acquisition is recommended.

The accompanying profile for this stream calls is a "wash water containing zinc", but this sample is low in zinc from our view. This water has a pH of 9. It treats easily and produces a nice large floc. The neat sample is murky looking with solids at 4%. The solids almost look like dirt or clay. The metals on the treated sample are acceptable, the TOC is 1746 ppm, an acceptable level, and there are no phenolics. A base price for processing this water should be no less than $0.10/gal with a surcharge for solids above 5%.

A summary of the analytical testing is found in the table below.

Rineco - Schlumberger North Campus	
Evaluation 0109-48	
Solids, vol%	4.0
pH	9
Phenols, ppm	0
TOC, mg/L	1746
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	0.182
Zn	0.110
Cd	0.056
Cu	0.000
Cr	0.260

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Gary Peterson, Prabhaker,
Joe Camp, Clint Hopkins

Date: 1/26/09

From: Miles Root

Lab Memo: 09-005

Subject: **Rineco Evaluation 0109-49**

A sample of waste water from Rineco has been evaluated for potential processing at CES. This sample is evaluation 0109-49, and is a sample of waste water generated by Schlumberger, North Campus. This water results from equipment cleaning and production. The potential volume of this stream is 3000 gallons per month. Overall, this water can be processed at CES with minimal effort and should be considered good water for treatment. Its acquisition is recommended.

The accompanying profile for this stream calls is an "oily/zinc water stream, but this sample has no oils and is not high in zinc levels. This water has a pH of 7. It treats easily and without issues. It is clean looking with solids at 0.5%. The metals on the treated sample are acceptable, the TOC is 9185 ppm, an acceptable level, and there are no phenolics. A base price for processing this water should be no less than $0.10/gal with surcharges for TOC values greater than 5000 ppm.

A summary of the analytical testing is found in the table below.

Rineco - Schlumberger North Campus	
Evaluation 0109-49	
Solids, vol%	0.5
pH	7
Phenols, ppm	0
TOC, mg/L	9,185
Oil, vol%	0
Treatability	OK
Metals, ppm	
Ni	0.126
Zn	0.293
Cd	0.042
Cu	0.000
Cr	0.020

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Matt Bowman, Gary Peterson, Prabhaker, Joe Camp, Clint Hopkins

Date: 1/23/09

From: Miles Root

Lab Memo: 09-004

Subject: **Superbag Corp Evaluation 0109-47**

A sample of oily sludge from Superbag Corp, Houston, has been evaluated for disposal into a class 1 liquids box. This sample is evaluation 0109-47 and is a sample of oily sludge from a process that uses oil, inks, ammonia and water. The potential volume of this source is 40 drums.

The pH of this material is 6. Its odor is noticeable at close range, but does not carry far. While odor is subjective, I would classify this odor as on the mild side and definitely not offensive. It does not have the piercing odor of ammonia one would suspect from looking at its MSDS. I do not believe that odor will be an issue when this material is disposed into a class 1 liquids box. The pH is very acceptable.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Matt Bowman, Gary Peterson, Prabhaker, Joe Camp, Clint Hopkins

Date: 1/13/09

From: Miles Root

Lab Memo: 09-003

Subject: **CH & S Evaluation 0109-33**

A sample of oily sludge from CH & S, Alvin, TX, has been evaluated for potential tank cleaning by CES. This sample is evaluation 0109-33 and is a sample of oily sludge from an underground tank. Overall, this material may be cleaned from the tank, possibly without heat, and solubilized or even cleaned out with black oil, if desired. It has a decent BTU value so may even be marketed in that area instead of just treating this material as a waste.

This sample looks like a very thick tank bottoms sludge. It contains what appears to be sand/dirt/grit along with tank bottoms sludge. It is very thick and possibly pumpable as is. When heated, it becomes what I call very pumpable liquid or thin slurry. When heated at low temperature on a hot plate in the lab, no mixing was necessary to "liquefy" this sample. This is good because its shows that mixing is not really critical, and that the material will conduct heat fairly well. When liquefied, the sample still appears to have its sand/grit/dirt entrained. The BTU on this material is 10,588. The water concentration is 16.5 wt%. This material appears to mix with black oil and black oil could be used to help solubilize this material in order to pump it from its current container if needed.

Overall, this material can be cleaned out from its storage tank, possibly without heat. This material may be blended with black oil, if needed, to keep it solubilized. Its good BTU value should make it a good fuel for some type of market.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Shannon Ward
Cc: Matt Bowman, Gary Peterson, Prabhaker, Joe Camp, Clint Hopkins

Date: 1/05/09

From: Miles Root

Lab Memo: 09-002

Subject: **Kinder Morgan Evaluation 0109-07**

A sample of waste water from Kinder Morgan, Pasadena, has been evaluated for any recoverable hydrocarbons. This sample is evaluation 0109-07 and is sludge/liquid from a pit clean out. Overall, this material may be brought in and treated as oily water for disposal, but it has no real recoverable hydrocarbons value.

This sample looks like sludgy water. The material is dark and murky due to the sludge. When allowed to sit, a top portion of the sample mixes readily with water. Sludge does settle out to the bottom. A portion of the sample was distilled to see if any hydrocarbons were present, as the sample does have a hydrocarbon odor. A distillation of the entire sample shows approximately 1% recoverable hydrocarbons with the remainder being water. The distillate comes over near to water white. Severe foaming in the pot is present for the first 10% of the distillation and calms down by the time 20% is distilled overhead.

My understanding of this source is that we would like to recover the hydrocarbons. My testing has been geared in that direction. There are at best 1% recoverable hydrocarbons in this sample. If it is decided that a different approach needed, then further testing will be required for this stream.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Matt Bowman, Gary Peterson, Prabhaker, Joe Camp, Clint Hopkins

Date: 1/05/09

From: Miles Root

Lab Memo: 09-001

Subject: **International Terminals Evaluation 0109-02**

A sample of refrigerant oil from International Terminals, Pasadena, has been evaluated for potential acquisition. This sample is evaluation 0109-02 and is a sample of refrigerant oil that has been drained from equipment. This material is recommended for acquisition to be sold "as is". There is approximately 80 to 100 barrels of this material available.

This is base oil looking material that has no water. It is on the darker side of base oil, but still would not be classified as black oil. It has a slight cloudiness or haze look to it. The chlor-d-tect is only 200 ppm and this material has no ash, a BTU value of 8814 BTU/lb with a flash point greater than 140 deg F. This is heavy oil with a density of 1.17. Viscosities were determined at both 40 and 100 deg C. They are 91 cSt and 12 cSt respectively.

We do not want to blend this material with black oil. My test sample appeared to blend readily when mixed, but appeared to phase separate when allowed to sit overnight. It may mix when heated, but this material is more like base oil and should be marketed as such.

The table below summarizes the analytical testing.

International Terminal	
Evaluation 0109-02	
Water, ppm	0
Flash Point, deg F	>140
BTU/lb	8814
Ash, wt%	0
Chlor-d-tect, ppm	200
Viscosity @ 40 deg C, cSt	91
Viscosity @ 100 deg C, cSt	12
Density	1.170

Profiling

LAB
T-32
8/14/09
cw

CES Environmental Services, Inc.

To: Matt Bowman Jennifer Rust
Cc: Miles Root, Prabhaker,
Matt Moser, Joe Camp, Marlin Moser

Date: 10/014/08

From: Gary Peterson

Subject: **Lancer Industries, Beacon Energy, Cleburne, TX**

A 1 gallon sample of "slop oil" from Lancer Industries (broker), Beacon Energy, Cleburne, TX (generator) was received for evaluation for potential processing at CES. The sample was evaluated 10-14-2008. The material received came with a MSDS sheet. From the physical appearance, odor, etc. it is with pretty good confidence the waste is from a biodiesel processing plant. The MSDS paperwork received with the sample states that the material is comprised of:

1. Emulsified oils/fats 40-50%
2. Emulsified water/phosphatides 40-50%
3. Glycerin 0-5%
4. Methanol 0-5%

THE RECEIVED SAMPLE IS NON CONFORMING TO THE MSDS SHEET.

This volume of this waste stream in gallons was not provided.

The material received was not at all representative of the composition of the MSDS. The material received was bi-layered.

- The bottom emulsified sludge layer is a tan color that is a thin pumpable sludge and appears to be the "emulsified oils/fats" as indicated in the MSDS.
    a. The flash point was greater than 140 Deg F.
    b. The pH = 4.5- 5.0
    c. NOT compatible with any CES fuel or oil streams.
- The top layer is clear oil with a medium dark vegetable oil color. THE TOP LAYER APPEARS TO BE GOOD BIODIESEL. The Btu is in the 13, 000 – 14,000 range (13,571). THIS LAYER CAN MIX WITH LIGHT ENDS, BLACK OIL & WITH BASE OIL. **I DOUBT IF WE WOULD RECEIVE ANY OF THIS TOP OIL PHASE. The MSDS does not list any of this bio-diesel material.**

Several emulsified fat/oil waste streams have been received from biodiesel processing plants. This material treats the same as many of the other fatty acid waste's received for profiling at CES. Miles has done many treatability studies on these types of wastes. This waste is no different.

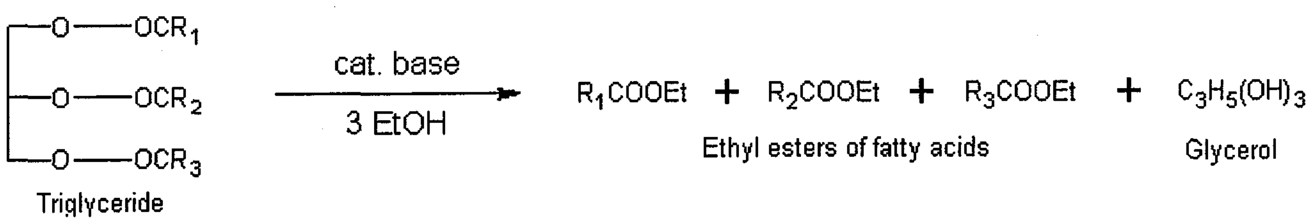
<u>AT THIS POINT THE EMULSIFIED FAT/OIL MATERIAL WOULD HAVE TO PROCESS TO OFFSITE LANDFILL. The material is not compatible with light ends, black oil or base oil. The flash point on this waste is greater than 140 Deg F so processing to a non-hazardous landfill is not a problem.</u>

<u>OPPORTUNITY ???</u>

POTENTIAL PROCESSING FOR MAKING A RAW MATERIAL "SOAP" for the soap manufacturing industry.

Right now just in the Houston and surrounding areas there are many processing plants producing Biodiesel. We have received at CES in the last few months several waste streams with the same basic make up as the two waste streams indicated above. See MILES EVALUATION FOR RADA 08-176, 1008-07. <u>I THINK THERE IS THE POTENTIAL FOR MAKING A PRECURSOR PRODUCT STREAM FOR SALE TO SOAP MANUFACTURERS.</u> I might be way off base but read the following. To pursue something like this would require a lot of discussion, evaluation, research on soap manufacturing, sales legwork on soap manufacture contacts, soap manufacture raw material needs and a lot more. <u>There are thousands of gallons of this waste by-product material being generated from biodiesel production. Whether or not something can be done with it is the purpose of the discussion here.</u>

A good generic term for biodiesel process is called "Transesterification". The feedstock for making biodiesel should be as free as possible from the presence of fatty acids. This is why pure oils (soybean oil, vegetable oils, corn oils, etc.) are the preferred starting raw material for the manufacturing of Biodiesel. This can get pretty complicated but all of the pure oils I mentioned consist of triglycerides as well as certain percentages of fatty acids. Below is the basic reaction for manufacturing of biodiesel.



The ethyl esters of fatty acids are the "biodiesel". Methanol could have been used just as well as the ethanol. If methanol was used then the biodiesel would be methyl esters. This reaction above only lists the by-product of glycerol (glycerin). The reaction is not a clean as described above. Along with the generation of glycerin there are fatty acids generated. The fatty acids are long chain carboxylic acids (generally C4 and longer up to and over C14). So in the following chemical structure the R could be 4 up to and over 14, R(4-14+)COOH.

Chemically, soap is a salt of a fatty acid. Traditionally, soap is made by the reaction between a fat (fatty acid) and a strong alkali such as sodium hydroxide or potassium hydroxide. This is called "saponification". This is exactly what Miles did in evaluation 1008-07. This was also done with the evaluation of the Lancer Ind. (Beacon Energy). Both waste streams and reaction chemistry are really identical. AND ALL OF THE SIMILAR WASTE STREAMS GENERATED FROM BIODIESEL PROCESSING WOULD BE THE SAME. Some waste streams are a little "Cleaner" or less odorous than others. I think these waste streams are using a little cleaner starting raw material (a better Chicken Fat VS Pork Fat VS good vegetable oil's).

The reaction is easy, fast and I think the final material would process through a centrifuge separating out the soap from the biodiesel fuel still remaining in the waste stream. Jay looked at the material and he thinks the material would process well through a centrifuge.

The reaction to create a "SOAP" uses a caustic: Na^+ OH^- mixed with the fatty acid $CH_3\text{-}(CH_2)_n\text{-}COO^-$ H^+. Just mix the two well without any heat just at ambient temperature and you end up with a "SOAP". (fatty end) $:CH_3\text{-}(CH_2)_n\text{-}CO_2^-$ ^+Na: (water soluble end)

This is a crude soap but I think this potentially could be a great starting raw material for a soap manufacturer. In the processing of this emulsified fat/oil waste and making a potential crude soap a biodiesel product up to 20% to 30% + is produced. This "fuel" that would be generated in this process mixes with light ends, base oil and black oil.

POTENTIAL PROCESSING PLAN (Dedicated Plant: again to pursue something like this would require a lot of discussion, evaluation, research on soap manufacturing, sales legwork on soap manufacture contacts, soap manufacture raw material needs and a lot more).

1. **<u>Processing of this material would require a clean dedicated tank and a new processing system.</u>** The processing of this material requires a caustic treatment in order to cause a chemical separation of the phases. In a dirty tank the majority of any type of petroleum hydrocarbon organics and/or sludge would go into solution in the caustic phase of the required treatment and would create an "emulsion".
2. Treatment with a 10% concentration caustic chemical in a dedicated treatment tank **<u>would require the ability to mix well.</u>** Even just slight "swirling action" mixing in a small container in a laboratory environment should be considered equivalent to a very good mixing ability in a large treatment tank (~ 10,000 gallons or more).
3. **<u>Settling of the mixed treatment tank would require several hours.</u>** Just settling would not be a very good process if this were to be pursued. PROCESSING THROUGH A CENTRIFUGE would be THE BEST PROCESSING option (dedicated plant). Settling of the material in a small lab treatment container did not provide an immediate separation. The phase breaks take some time to become even close to a very distinctive break. I do not think there is really what you could call a very "sharp phase break" which would be most desirable in processing. The good biodiesel oil material would just be taken from above the "emulsion layer" if settling was the process. Use of a centrifuge would be best for processing. THIS

MATERIAL HAS THE ODOR SIMILAR TO VEGETABLE OIL, so this waste material looks like it came from a biodiesel process that had a quality starting raw material. The material received for processing MUST have this same type of odor and not the odor of an animal fat type of biodiesel waste material.

4. The bottom caustic layer as well as the middle "soap emulsion" phase can both be used to treat the next batch after the good top oil phase has been removed and put into a dedicated trailer.
5. At the end of treatment the bottom well separated caustic/water layer looked pretty clear. The caustic value is low. Depending on the TOC and flash point this bottom phase may be able to be treated in Waste water.
6. The middle fatty acid salt "Soap" layer may have a flash point. The fatty acids from the biodiesel process when treated in this manner form a "salt of a fatty acid". This material can really become a pretty thick material and I think would solidify pretty easily in the solids box. This "soap" middle layer is the layer of material that could potentially be a material that could be sold to the soap manufacturing industry.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Inbound Load Report

Job Number : 65076

Type of Material: ROS

Job Date: 6/4/2008

Bill of Lading #: 65076

Customer: Lubrizol-Deer Park

Gross Weight: 68160

Tare Weight: 34420 **OR** **Total Gallons Shipped:** 4498.66

Net Weight: 33740

Shipping Information

Carrier: CES Environmental Services, Inc.

Truck Number:

Trailer Number: 243

CES Laboratory Use Only

Specific Gravity:	.900
Pounds per Gallon:	7.50
Temperature:	
Total Gross Gallons:	4499
% Water	0
% Solids	0
Total Net Gallons:	4499

(minus water and solids)

Misc Notes:

0.000% ash
API value of 26
0% Rag

Platts 80.65
Trans 5hr

Sample Analyst: ____________________

(signature)

Sample Analyst: Sam Brown **Date:** 6/5/2008

EPAHO113001224

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Inbound Load Report

Job Number : 65430

Type of Material: ROS

Job Date: 6/6/2008

Bill of Lading #: 65430

Customer: Lubrizol-Deer Park

Gross Weight: 64240

Tare Weight: 32500 **OR** **Total Gallons Shipped:** 4182.36

Net Weight: 31740

Shipping Information

Carrier:

Truck Number:

Trailer Number:

CES Laboratory Use Only

Specific Gravity: 0.91

Pounds per Gallon: 7.589

Temperature:

Total Gross Gallons:

% Water 1% 8

% Solids 0

Total Net Gallons:

(minus water and solids)

Misc Notes:

Ash 0.01%
0% Rag
Platts 92.80
Trans 4 hr

Sample Analyst:

(signature)

Sample Analyst: Godefroy Gbery **Date:** 6/7/2008

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Inbound Load Report

Job Number : 66843

Type of Material: ROS

Job Date: 6/27/2008

Bill of Lading #: 66843

Customer: Lubrizol - Bayport

Gross Weight: 73840

Tare Weight: 35500 **OR** **Total Gallons Shipped:** 4739.18

Net Weight: 38340

Shipping Information

Carrier:

Truck Number:

Trailer Number:

CES Laboratory Use Only

Specific Gravity: 0.97

Pounds per Gallon: 8.09

Temperature:

Total Gross Gallons:

% Water 20

% Solids ~~40~~ 20

Total Net Gallons:

(minus water and solids)

Misc Notes:

~~From the solid 20 % rag layer~~ 20% Rag

Ash = ? 2.4

Platts 101.00

Trans 4.75hr

Sample Analyst:

(signature)

Sample Analyst: Godefroy Gbery **Date:** 6/27/2008

EPAHO113001226

Gary Peterson

From: Gary Peterson
Sent: Wednesday, July 16, 2008 9:29 AM
To: Matt Moser; Joe Camp; Miles Root
Cc: Marlin Moser
Subject: ZACH, Job 67756, Trailer 215, Profile 2880, WATER WASH INFO, 7-16-2008

1. **ZACH, trailer 215**; Job no. 67756; 5,253 gallons, density .776, pH = 4.6; 10% water wash (525 gallons of water).
    a. The top phase extraction with a 10% water wash leaves **a top phase volume of 1,471 gallons** of non-water soluble clear organics.
    b. **The remaining bottom phase water wash total volume including the water added is 4,307 gallons** (this is 3,782 gallons of the initial material plus 525 gallons of water). The bottom phase remaining will contain 12% by volume of water just from the water added for extraction.
    c. Distillation of the material without water extraction showed a 93% solvent recovery. Doing calculations this shows that the bottom phase from the water extraction will contain about 57% of water soluble mixed solvents that could be recovered by distillation.

A distillation on the material performed on Zach trailer 215 itself, document 67756, PFI 2880, which is a mixed solvents stream that according to received analysis from ZACH shows the material to contain predominantly MTBE and methanol showed a recovery of overhead solvent up to 93%.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

Gary Peterson

From: Gary Peterson
Sent: Thursday, July 10, 2008 10:40 AM
To: Kelli Lofton; Melba Stephens; Kara Disney; Juanita Thomas; Kelli Lofton; Ryan Thomas
Cc: Marlin Moser; Matt Moser; Joe Camp; Miles Root; Sam Brown; Godefroy Gbery; Bo Cumberland
Subject: Lubrizol, ROS, Profile 1216 billing for Inbound (and similar oil product streams); 7-10-2008; IMPORTANT

Please look at the following information. This is what will be required to calculate the charges for an Oil product load that is received with Oil, rag, water and solids for proper billing.

Lubrizol, ROS, Profile 1216,Job number 67686.

The billing PFI states the following:

Depends on results of testing; if ash 0.7% or below (and water below 1%) - we pay 55% of Platts
If Ash above 0.7% up to 2% - we pay 40% of Platts and charge for water (0.15/gallon), solids (0.45/gallon), and rag (0.25/gallon)
If Ash above 2% up to 5% - we pay 30% of Platts and charge other phases as above
If ash above 5% - we do not pay for oil phase, but still charge for other phases as above
Charge $69/hour for transp. Plus current fuel surcharge

The load we have right now is 18.6% water, 10% solids, 10% rag and 61.4% of oil. **The pounds of the load received is 33,360 pounds.** The following densities are used for the different phases:

I. Water 1.00 density (8.34 #'s gallon) – 18.6%
II. Rag .95 density (7.93 #'s gallon) – 10%
III. Solids 1.30 density (10.84 #'s gallon) – 10%
IV. Oil (measured) .92 density (7.68 #'s gallon) – 61.4%

A. From the percentage of each contaminant present the pound volume of each of the different phases need to be calculated.
B. Then from the pound volume of each contaminant the gallon volume needs to be calculated.
C. Then from the gallon volume calculated the cost for those gallons for the received load needs to be calculated.

<u>From the information above the following is the data that would be inputted into the inbound billing data section FOR BILLING:</u>

V. **Water** 1.00 (8.34 #'s gallon) – 18.6% = 6,205 #'s = **744 GALLONS = $111.60**
VI. **Rag** .95 (7.93 #'s gallon) – 10% = 3,336 #'s = **421 GALLONS = $105.25**
VII. **Solids** 1.30 (10.84 #'s gallon) – 10% = 3.336 #'s = **308 GALLONS = $138.60**
VIII. **Oil (**measured) .92 (7.68 #'s gallon) – 61.4% = 20,483 #'s = **2,667 GALLONS**
IX. Oil ASH = 0.78%

4,140

Any questions ?

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

Lubrizol Billing Example

Recovered Oil Skimmings

Job 67686 1216 7-10-08

Oil=61.4%, 2,667 gallons with an ash of 0.78%, reduce oil payment

Rag=10%, 421 gallons, charge $105.25

Solids= 10%, 308 gallons, charge $138.60

Water= 18.6%,744 gallons, charge $111.60

Job 67685 7-10-08

Oil=59%, 3,236 gallons with an ash of 1.05%, reduce oil payment

Rag=17%, 912 gallons, charge $228.00

Solids= 4%, 157 gallons, charge $70.65

Water= 20%, 1,021 gallons, charge $153.25

EPA Proposes Amendments to Hazardous Organic NESHAP Rule

Source: ChemAlliance Staff
Date: 1/23/2000

The EPA is proposing amendments to the rule, ``National Emission Standards for Hazardous Air Pollutants for Source Categories: Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry and Other Processes Subject to the Negotiated Regulation for Equipment Leaks", commonly known as the Hazardous Organic NESHAP or the HON. The amendments are to modify the definition of the term "process vent" and to add procedures for identifying ``process vents" in order to ensure consistent interpretation of the term. EPA is also proposing to add provisions to allow off-site control of process vent emissions and to add provisions for establishing a new compliance date under certain circumstances. Comments on the proposed rule must be received on or before February 22, 2000, unless a hearing is requested by January 31, 2000. If a hearing is requested, you must submit your comments on or before March 6, 2000. For more information, contact Dr. Janet S. Meyer, Coatings and Consumer Products Group, at (919) 541-5254 (meyer.jan@epamail.epa.gov).

For more information:
http://www.epa.gov/fedrgstr/EPA-AIR/2000/January/Day-20/a1070.htm

Table II. EPCRA Section 313 Chemical List For Reporting Year 2006 (including Toxic Chemical Categories)

Individually listed EPCRA Section 313 chemicals with CAS numbers are arranged alphabetically starting on page II-3. Following the alphabetical list, the EPCRA Section 313 chemicals are arranged in CAS number order. Covered chemical categories follow.

Certain EPCRA Section 313 chemicals listed in Table II have parenthetic "qualifiers." These qualifiers indicate that these EPCRA Section 313 chemicals are subject to the section 313 reporting requirements if manufactured, processed, or otherwise used in a specific form or when a certain activity is performed. The following chemicals are reportable only if they are manufactured, processed, or otherwise used in the specific form(s) listed below:

Chemical	CAS Number	Qualifier
Aluminum (fume or dust)	7429-90-5	Only if it is a fume or dust form.
Aluminum oxide (fibrous forms)	1344-28-1	Only if it is a fibrous form.
Ammonia (includes anhydrous ammonia and aqueous ammonia from water dissociable ammonium salts and other sources; 10 percent of total aqueous ammonia is reportable under this listing)	7664-41-7	Only 10% of aqueous forms. 100% of anhydrous forms.
Asbestos (friable)	1332-21-4	Only if it is a friable form.
Hydrochloric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)	7647-01-0	Only if it is an aerosol form as defined.
Phosphorus (yellow or white)	7723-14-0	Only if it is a yellow or white form.
Sulfuric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)	7664-93-9	Only if it is an aerosol form as defined.
Vanadium (except when contained in an alloy)	7440-62-2	Except if it is contained in an alloy.
Zinc (fume or dust)	7440-66-6	Only if it is in a fume or dust form.

The qualifier for the following three chemicals is based on the chemical activity rather than the form of the chemical. These chemicals are subject to EPCRA section 313 reporting requirements only when the indicated activity is performed.

Chemical/ Chemical Category	CAS Number	Qualifier
Dioxin and dioxin-like compounds (manufacturing; and the processing or otherwise use of dioxin and dioxin-like compounds if the dioxin and dioxin-like compounds are present as contaminants in a chemical and if they were created during the manufacture of that chemical.)	NA	Only if they are manufactured at the facility; or are processed or otherwise used when present as contaminants in a chemical but only if they were created during the manufacture of that chemical.
Isopropyl alcohol (only persons who manufacture by the strong acid process are subject, no supplier notification)	67-63-0	Only if it is being manufactured by the strong acid process. Facilities that process or otherwise use isopropyl alcohol are not covered and should not file a report.
Saccharin (only persons who manufacture are subject, no supplier notification)	81-07-2	Only if it is being manufactured.

There are no supplier notification requirements for isopropyl alcohol and saccharin since the processors and users of these chemicals are not required to report. Manufacturers of these chemicals do not need to notify their customers that these are reportable EPCRA section 313 chemicals.

Note: Chemicals may be added to or deleted from the list. The Emergency Planning and Community Right-to-Know Call Center will provide up-to-date information on the status of these changes. See section B.3.c of the instructions for more information on the *de minimis* values listed below. There are no *de minimis* levels for PBT chemicals since the *de minimis* exemption is not available for these chemicals (an asterisk appears where a *de minimis* limit would otherwise appear in Table II). However, for purposes of the supplier notification requirement only, such limits are provided in Appendix D.

Chemical Qualifiers

This table contains the list of individual EPCRA Section 313 chemicals and categories of chemicals subject to 2005 calendar year reporting. Some of the EPCRA Section 313 chemicals listed have parenthetic qualifiers listed next to them. An EPCRA Section 313 chemical that is listed without a qualifier is subject to reporting in all forms in which it is manufactured, processed, and otherwise used.

Fume or dust. Two of the metals on the list (aluminum and zinc) contain the qualifier "fume or dust." Fume or dust refers to dry forms of these metals but does not refer to "wet" forms such as solutions or slurries. As explained in Section B.3.a of these instructions, the term manufacture includes the generation of an EPCRA Section 313 chemical as a byproduct or impurity. In such cases, a facility should determine if, for example, it generated more than 25,000 pounds of aluminum fume or dust in the reporting year as a result of its activities. If so, the facility must report that it manufactures "aluminum (fume or dust)." Similarly, there may be certain technologies in which one of these metals is processed in the form of a fume or dust to make other EPCRA Section 313 chemicals or other products for distribution in commerce. In reporting releases, the facility would only report releases of the fume or dust.

EPA considers dusts to consist of solid particles generated by any mechanical processing of materials including crushing, grinding, rapid impact, handling, detonation, and decrepitation of organic and inorganic materials such as rock, ore, and metal. Dusts do not tend to flocculate, except under electrostatic forces.

EPA considers a fume to be an airborne dispersion consisting of small solid particles created by condensation from a gaseous state, in distinction to a gas or vapor. Fumes arise from the heating of solids such as lead. The condensation is often accompanied by a chemical reaction, such as oxidation. Fumes flocculate and sometimes coalesce.

Manufacturing qualifiers. Two of the entries in the EPCRA Section 313 chemical list contain a qualifier relating to manufacture. For isopropyl alcohol, the qualifier is "only persons who manufacture by the strong acid process are subject, no supplier notification." For saccharin, the qualifier is "only persons who manufacture are subject, no supplier notification." For isopropyl alcohol, the qualifier means that only facilities manufacturing isopropyl alcohol by the strong acid process are required to report. In the case of saccharin, only manufacturers of the EPCRA Section 313 chemical are subject to the reporting requirements. A facility that only processes or otherwise uses either of these EPCRA Section 313 chemicals is not required to report for these EPCRA Section 313 chemicals. In both cases, supplier notification does not apply because only manufacturers, not users, of these two EPCRA Section 313 chemicals must report.

Ammonia (includes anhydrous ammonia and aqueous ammonia from water dissociable ammonium salts and other sources; 10 percent of total aqueous ammonia is reportable under this listing). The qualifier for ammonia means that anhydrous forms of ammonia are 100% reportable and aqueous forms are limited to 10% of total aqueous ammonia. Therefore when determining threshold and releases and other waste management quantities all anhydrous ammonia is included but only 10% of total aqueous ammonia is included. Any evaporation of ammonia from aqueous ammonia solutions is considered anhydrous ammonia and should be included in threshold determinations and release and other waste management calculations.

Sulfuric acid and Hydrochloric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size). The qualifier for sulfuric acid and hydrochloric acid means that the only forms of these chemicals that are reportable are airborne forms. Aqueous solutions are not covered by this listing but any aerosols generated from aqueous solutions are covered.

Nitrate compounds (water dissociable; reportable only when in aqueous solution). The qualifier for the nitrate compounds category limits the reporting to nitrate compounds that dissociate in water, generating nitrate ion. For the purposes of threshold determinations the entire weight of the nitrate compound must be included in all calculations. For the purposes of reporting releases and other waste management quantities only the weight of the nitrate ion should be included in the calculations of these quantities.

Phosphorus (yellow or white). The listing for phosphorus is qualified by the term "yellow or white." This means that only manufacturing, processing, or otherwise use of phosphorus in the yellow or white chemical form triggers reporting. Conversely, manufacturing, processing, or otherwise use of "black" or "red" phosphorus does not trigger reporting. Supplier notification also applies only to distribution of yellow or white phosphorus.

Asbestos (friable). The listing for asbestos is qualified by the term "friable," referring to the physical characteristic of being able to be crumbled, pulverized, or reducible to a powder with hand pressure. Only manufacturing, processing, or otherwise use of asbestos in the friable form triggers reporting. Supplier notification applies only to distribution of mixtures or other trade name products containing friable asbestos.

Aluminum Oxide (fibrous forms). The listing for aluminum oxide is qualified by the term "fibrous forms." Fibrous refers to a man-made form of aluminum oxide that is processed to produce strands or filaments which can be cut to various lengths depending on the application. Only manufacturing, processing, or otherwise use of aluminum oxide in the fibrous form triggers reporting. Supplier notification applies only to distribution of mixtures or other trade name products containing fibrous forms of aluminum oxide.

Notes for Sections A and B of following list of TRI chemicals:

"Color Index" indicated by "C.I."

* There are no *de minimis* levels for PBT chemicals, except for supplier notification purposes (see Appendix D).

a. Individually-Listed Toxic Chemicals Arranged Alphabetically

CAS Number	Chemical Name	*De Minimis* Limit
71751-41-2	Abamectin [Avermectin B1]	1.0
30560-19-1	Acephate (Acetylphosphoramidothioic acid O,S-dimethyl ester)	1.0
75-07-0	Acetaldehyde	0.1
60-35-5	Acetamide	0.1
75-05-8	Acetonitrile	1.0
98-86-2	Acetophenone	1.0
53-96-3	2-Acetylaminofluorene	0.1
62476-59-9	Acifluorfen, sodium salt [5-(2-Chloro-4-(trifluoromethyl)phenoxy)-2-nitrobenzoic acid, sodium salt]	1.0
107-02-8	Acrolein	1.0
79-06-1	Acrylamide	0.1
79-10-7	Acrylic acid	1.0
107-13-1	Acrylonitrile	0.1
15972-60-8	Alachlor	1.0
116-06-3	Aldicarb	1.0
309-00-2	Aldrin [1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-(1.alpha.,4.alpha.,4a.beta., 5.alpha.,8.alpha.,8a.beta.)-]	*
28057-48-9	d-trans-Allethrin [d-trans-Chrysanthemic acid of d-allethrone]	1.0
107-18-6	Allyl alcohol	1.0
107-11-9	Allylamine	1.0
107-05-1	Allyl chloride	1.0
7429-90-5	Aluminum (fume or dust)	1.0
20859-73-8	Aluminum phosphide	1.0
1344-28-1	Aluminum oxide (fibrous forms)	1.0
834-12-8	Ametryn (N-Ethyl-N'-(1-methylethyl)-6-(methylthio)-1,3,5,-triazine-2,4-diamine)	1.0
117-79-3	2-Aminoanthraquinone	0.1
60-09-3	4-Aminoazobenzene	0.1
92-67-1	4-Aminobiphenyl	0.1
82-28-0	1-Amino-2-methylanthraquinone	0.1

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CAS Number	Chemical Name	*De Minimis* Limit
33089-61-1	Amitraz	1.0
61-82-5	Amitrole	0.1
7664-41-7	Ammonia (includes anhydrous ammonia and aqueous ammonia from water dissociable ammonium salts and other sources; 10 percent of total aqueous ammonia is reportable under this listing)	1.0
101-05-3	Anilazine [4,6-Dichloro-N-(2-chlorophenyl)-1,3,5-triazin-2-amine]	1.0
62-53-3	Aniline	1.0
90-04-0	o-Anisidine	0.1
104-94-9	p-Anisidine	1.0
134-29-2	o-Anisidine hydrochloride	0.1
120-12-7	Anthracene	1.0
7440-36-0	Antimony	1.0
7440-38-2	Arsenic	0.1
1332-21-4	Asbestos (friable)	0.1
1912-24-9	Atrazine (6-Chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine)	1.0
7440-39-3	Barium	1.0
22781-23-3	Bendiocarb [2,2-Dimethyl-1,3-benzodioxol-4-ol methylcarbamate]	1.0
1861-40-1	Benfluralin (N-Butyl-N-ethyl-2,6-dinitro-4-(trifluoromethyl)benzenamine)	1.0
17804-35-2	Benomyl	1.0
98-87-3	Benzal chloride	1.0
55-21-0	Benzamide	1.0
71-43-2	Benzene	0.1
92-87-5	Benzidine	0.1
98-07-7	Benzoic trichloride (Benzotrichloride)	0.1
191-24-2	Benzo(g,h,i)perylene	*
98-88-4	Benzoyl chloride	1.0
94-36-0	Benzoyl peroxide	1.0
100-44-7	Benzyl chloride	1.0
7440-41-7	Beryllium	0.1
82657-04-3	Bifenthrin	1.0
92-52-4	Biphenyl	1.0
111-91-1	Bis(2-chloroethoxy) methane	1.0
111-44-4	Bis(2-chloroethyl) ether	1.0
542-88-1	Bis(chloromethyl) ether	0.1
108-60-1	Bis(2-chloro-1-methylethyl)ether	1.0
56-35-9	Bis(tributyltin) oxide	1.0
10294-34-5	Boron trichloride	1.0
7637-07-2	Boron trifluoride	1.0
314-40-9	Bromacil (5-Bromo-6-methyl-3-(1-methylpropyl)-2,4(1H,3H)-pyrimidinedione)	1.0
53404-19-6	Bromacil, lithium salt [2,4(1H,3H)-Pyrimidinedione,5-bromo-6-methyl-3-(1-methylpropyl), lithium salt]	1.0
7726-95-6	Bromine	1.0
35691-65-7	1-Bromo-1-(bromomethyl)-1,3-propanedicarbonitrile	1.0
353-59-3	Bromochlorodifluoromethane (Halon 1211)	1.0
75-25-2	Bromoform (Tribromomethane)	1.0
74-83-9	Bromomethane (Methyl bromide)	1.0
75-63-8	Bromotrifluoromethane (Halon 1301)	1.0
1689-84-5	Bromoxynil (3,5-Dibromo-4-hydroxybenzonitrile)	1.0
1689-99-2	Bromoxynil octanoate (Octanoic acid, 2,6-dibromo-4-cyanophenylester)	1.0
357-57-3	Brucine	1.0
106-99-0	1,3-Butadiene	0.1
141-32-2	Butyl acrylate	1.0
71-36-3	n-Butyl alcohol	1.0
78-92-2	sec-Butyl alcohol	1.0
75-65-0	tert-Butyl alcohol	1.0
106-88-7	1,2-Butylene oxide	0.1
123-72-8	Butyraldehyde	1.0
7440-43-9	Cadmium	0.1
156-62-7	Calcium cyanamide	1.0
133-06-2	Captan [1H-Isoindole-1,3(2H)-dione, 3a,4,7,7a-tetrahydro-2-[(trichloromethyl)thio]-]	1.0
63-25-2	Carbaryl [1-Naphthalenol, methylcarbamate]	1.0
1563-66-2	Carbofuran	1.0
75-15-0	Carbon disulfide	1.0
56-23-5	Carbon tetrachloride	0.1
463-58-1	Carbonyl sulfide	1.0
5234-68-4	Carboxin (5,6-Dihydro-2-methyl-N-phenyl-1,4-oxathiin-3-carboxamide)	1.0
120-80-9	Catechol	0.1
2439-01-2	Chinomethionat [6-Methyl-1,3-dithiolo[4,5-b]quinoxalin-2-one]	1.0
133-90-4	Chloramben [Benzoic acid, 3-amino-2,5-dichloro-]	1.0
57-74-9	Chlordane [4,7-Methanoindan, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-]	*

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CAS Number	Chemical Name	*De Minimis* Limit
115-28-6	Chlorendic acid	0.1
90982-32-4	Chlorimuron ethyl [Ethyl-2-[[[[(4-chloro-6-methoxyprimidin-2-yl)amino]carbonyl]amino]sulfonyl] benzoate]	1.0
7782-50-5	Chlorine	1.0
10049-04-4	Chlorine dioxide	1.0
79-11-8	Chloroacetic acid	1.0
532-27-4	2-Chloroacetophenone	1.0
4080-31-3	1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	1.0
106-47-8	p-Chloroaniline	0.1
108-90-7	Chlorobenzene	1.0
510-15-6	Chlorobenzilate [Benzeneacetic acid, 4-chloro-.alpha.- (4-chlorophenyl)-.alpha.-hydroxy-, ethyl ester]	1.0
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	1.0
75-45-6	Chlorodifluoromethane (HCFC-22)	1.0
75-00-3	Chloroethane (Ethyl chloride)	1.0
67-66-3	Chloroform	0.1
74-87-3	Chloromethane (Methyl chloride)	1.0
107-30-2	Chloromethyl methyl ether	0.1
563-47-3	3-Chloro-2-methyl-1-propene	0.1
104-12-1	p-Chlorophenyl isocyanate	1.0
76-06-2	Chloropicrin	1.0
126-99-8	Chloroprene	0.1
542-76-7	3-Chloropropionitrile	1.0
63938-10-3	Chlorotetrafluoroethane	1.0
354-25-6	1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	1.0
2837-89-0	2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	1.0
1897-45-6	Chlorothalonil [1,3-Benzenedicarbonitrile, 2,4,5,6-tetrachloro-]	0.1
95-69-2	p-Chloro-o-toluidine	0.1
75-88-7	2-Chloro-1,1,1-trifluoroethane (HCFC-133a)	1.0
75-72-9	Chlorotrifluoromethane (CFC-13)	1.0
460-35-5	3-Chloro-1,1,1-trifluoropropane (HCFC-253fb)	1.0
5598-13-0	Chlorpyrifos methyl [O,O-Dimethyl-O-(3,5,6-trichloro-2-pyridyl)phosphorothioate]	1.0
64902-72-3	Chlorsulfuron [2-Chloro-N-[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl] benzenesulfonamide]	1.0
7440-47-3	Chromium	1.0
4680-78-8	C.I. Acid Green 3	1.0
6459-94-5	C.I. Acid Red 114	0.1
569-64-2	C.I. Basic Green 4	1.0
989-38-8	C.I. Basic Red 1	1.0
1937-37-7	C.I. Direct Black 38	0.1
2602-46-2	C.I. Direct Blue 6	0.1
28407-37-6	C.I. Direct Blue 218	1.0
16071-86-6	C.I. Direct Brown 95	0.1
2832-40-8	C.I. Disperse Yellow 3	1.0
3761-53-3	C.I. Food Red 5	0.1
81-88-9	C.I. Food Red 15	1.0
3118-97-6	C.I. Solvent Orange 7	1.0
97-56-3	C.I. Solvent Yellow 3	0.1
842-07-9	C.I. Solvent Yellow 14	1.0
492-80-8	C.I. Solvent Yellow 34 (Auramine)	0.1
128-66-5	C.I. Vat Yellow 4	1.0
7440-48-4	Cobalt	0.1
7440-50-8	Copper	1.0
8001-58-9	Creosote	0.1
120-71-8	p-Cresidine	0.1
108-39-4	m-Cresol	1.0
95-48-7	o-Cresol	1.0
106-44-5	p-Cresol	1.0
1319-77-3	Cresol (mixed isomers)	1.0
4170-30-3	Crotonaldehyde	1.0
98-82-8	Cumene	1.0
80-15-9	Cumene hydroperoxide	1.0
135-20-6	Cupferron [Benzeneamine, N-hydroxy-N-nitroso, ammonium salt]	0.1
21725-46-2	Cyanazine	1.0
1134-23-2	Cycloate	1.0
110-82-7	Cyclohexane	1.0
108-93-0	Cyclohexanol	1.0
68359-37-5	Cyfluthrin [3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid, cyano(4-fluoro-3-phenoxyphenyl) methyl ester]	1.0
68085-85-8	Cyhalothrin [3-(2-Chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropane-carboxylic acid cyano(3-phenoxyphenyl)methyl ester]	1.0
94-75-7	2,4-D [Acetic acid, (2,4-dichlorophenoxy)-]	0.1
533-74-4	Dazomet (Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione)	1.0

Table II

CAS Number	Chemical Name	*De Minimis* Limit
53404-60-7	Dazomet, sodium salt [Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione, ion(1-), sodium]	1.0
94-82-6	2,4-DB	1.0
1929-73-3	2,4-D butoxyethyl ester	0.1
94-80-4	2,4-D butyl ester	0.1
2971-38-2	2,4-D chlorocrotyl ester	0.1
1163-19-5	Decabromodiphenyl oxide	1.0
13684-56-5	Desmedipham	1.0
1928-43-4	2,4-D 2-ethylhexyl ester	0.1
53404-37-8	2,4-D 2-ethyl-4-methylpentyl ester	0.1
2303-16-4	Diallate [Carbamothioic acid, bis(1-methylethyl)-S-(2,3-dichloro-2-propenyl) ester]	1.0
615-05-4	2,4-Diaminoanisole	0.1
39156-41-7	2,4-Diaminoanisole sulfate	0.1
101-80-4	4,4'-Diaminodiphenyl ether	0.1
95-80-7	2,4-Diaminotoluene	0.1
25376-45-8	Diaminotoluene (mixed isomers)	0.1
333-41-5	Diazinon	1.0
334-88-3	Diazomethane	1.0
132-64-9	Dibenzofuran	1.0
96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	0.1
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.1
124-73-2	Dibromotetrafluoroethane (Halon 2402)	1.0
84-74-2	Dibutyl phthalate	1.0
1918-00-9	Dicamba (3,6-Dichloro-2-methoxybenzoic acid)	1.0
99-30-9	Dichloran [2,6-Dichloro-4-nitroaniline]	1.0
95-50-1	1,2-Dichlorobenzene	1.0
541-73-1	1,3-Dichlorobenzene	1.0
106-46-7	1,4-Dichlorobenzene	0.1
25321-22-6	Dichlorobenzene (mixed isomers)	0.1
91-94-1	3,3'-Dichlorobenzidine	0.1
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	0.1
64969-34-2	3,3'-Dichlorobenzidine sulfate	0.1
75-27-4	Dichlorobromomethane	0.1
764-41-0	1,4-Dichloro-2-butene	1.0
110-57-6	trans-1,4-Dichloro-2-butene	1.0
1649-08-7	1,2-Dichloro-1,1-difluoroethane (HCFC-132b)	1.0
75-71-8	Dichlorodifluoromethane (CFC-12)	1.0
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	0.1
540-59-0	1,2-Dichloroethylene	1.0
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	1.0
75-43-4	Dichlorofluoromethane (HCFC-21)	1.0
75-09-2	Dichloromethane (Methylene chloride)	0.1
127564-92-5	Dichloropentafluoropropane	1.0
13474-88-9	1,1-Dichloro-1,2,2,3,3-pentafluoropropane (HCFC-225cc)	1.0
111512-56-2	1,1-Dichloro-1,2,3,3,3-pentafluoropropane (HCFC-225eb)	1.0
422-44-6	1,2-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225bb)	1.0
431-86-7	1,2-Dichloro-1,1,3,3,3-pentafluoropropane (HCFC-225da)	1.0
507-55-1	1,3-Dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb)	1.0
136013-79-1	1,3-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225ea)	1.0
128903-21-9	2,2-Dichloro-1,1,1,3,3-pentafluoropropane (HCFC-225aa)	1.0
422-48-0	2,3-Dichloro-1,1,1,2,3-pentafluoropropane (HCFC-225ba)	1.0
422-56-0	3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca)	1.0
97-23-4	Dichlorophene [2,2'-Methylenebis(4-chlorophenol)]	1.0
120-83-2	2,4-Dichlorophenol	1.0
78-87-5	1,2-Dichloropropane	1.0
10061-02-6	trans-1,3-Dichloropropene	0.1
78-88-6	2,3-Dichloropropene	1.0
542-75-6	1,3-Dichloropropylene	0.1
76-14-2	Dichlorotetrafluoroethane (CFC-114)	1.0
34077-87-7	Dichlorotrifluoroethane	1.0
90454-18-5	Dichloro-1,1,2-trifluoroethane	1.0
812-04-4	1,1-Dichloro-1,2,2-trifluoroethane (HCFC-123b)	1.0
354-23-4	1,2-Dichloro-1,1,2-trifluoroethane (HCFC-123a)	1.0
306-83-2	2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	1.0
62-73-7	Dichlorvos [Phosphoric acid, 2,2-dichloroethenyl dimethyl ester]	0.1
51338-27-3	Diclofop methyl [2-[4-(2,4-Dichlorophenoxy)phenoxy] propanoic acid, methyl ester]	1.0
115-32-2	Dicofol [Benzenemethanol, 4-chloro-.alpha.-(4-chlorophenyl)-.alpha.-(trichloromethyl)-]	1.0
77-73-6	Dicyclopentadiene	1.0

CAS Number	Chemical Name	*De Minimis* Limit
1464-53-5	Diepoxybutane	0.1
111-42-2	Diethanolamine	1.0
38727-55-8	Diethatyl ethyl	1.0
117-81-7	Di(2-ethylhexyl) phthalate (DEHP)	0.1
64-67-5	Diethyl sulfate	0.1
35367-38-5	Diflubenzuron	1.0
101-90-6	Diglycidyl resorcinol ether	0.1
94-58-6	Dihydrosafrole	0.1
55290-64-7	Dimethipin [2,3-Dihydro-5,6-dimethyl-1,4-dithiin 1,1,4,4-tetraoxide]	1.0
60-51-5	Dimethoate	1.0
119-90-4	3,3'-Dimethoxybenzidine	0.1
20325-40-0	3,3'-Dimethoxybenzidine dihydrochloride (o-Dianisidine dihydrochloride)	0.1
111984-09-9	3,3'-Dimethoxybenzidine hydrochloride (o-Dianisidine hydrochloride)	0.1
124-40-3	Dimethylamine	1.0
2300-66-5	Dimethylamine dicamba	1.0
60-11-7	4-Dimethylaminoazobenzene	0.1
121-69-7	N,N-Dimethylaniline	1.0
119-93-7	3,3'-Dimethylbenzidine (o-Tolidine)	0.1
612-82-8	3,3'-Dimethylbenzidine dihydrochloride (o-Tolidine dihydrochloride)	0.1
41766-75-0	3,3'-Dimethylbenzidine dihydrofluoride (o-Tolidine dihydrofluoride)	0.1
79-44-7	Dimethylcarbamyl chloride	0.1
2524-03-0	Dimethyl chlorothiophosphate	1.0
68-12-2	N,N-Dimethylformamide	1.0
57-14-7	1,1-Dimethyl hydrazine	0.1
105-67-9	2,4-Dimethylphenol	1.0
131-11-3	Dimethyl phthalate	1.0
77-78-1	Dimethyl sulfate	0.1
99-65-0	m-Dinitrobenzene	1.0
528-29-0	o-Dinitrobenzene	1.0
100-25-4	p-Dinitrobenzene	1.0
88-85-7	Dinitrobutyl phenol (Dinoseb)	1.0
534-52-1	4,6-Dinitro-o-cresol	1.0
51-28-5	2,4-Dinitrophenol	1.0
121-14-2	2,4-Dinitrotoluene	0.1
606-20-2	2,6-Dinitrotoluene	0.1
25321-14-6	Dinitrotoluene (mixed isomers)	1.0
39300-45-3	Dinocap	1.0
123-91-1	1,4-Dioxane	0.1
957-51-7	Diphenamid	1.0
122-39-4	Diphenylamine	1.0
122-66-7	1,2-Diphenylhydrazine (Hydrazobenzene)	0.1
2164-07-0	Dipotassium endothall [7-Oxabicyclo(2.2.1)heptane-2,3-dicarboxylic acid, dipotassium salt]	1.0
136-45-8	Dipropyl isocinchomeronate	1.0
138-93-2	Disodium cyanodithioimidocarbonate	1.0
94-11-1	2,4-D isopropyl ester	0.1
541-53-7	2,4-Dithiobiuret	1.0
330-54-1	Diuron	1.0
2439-10-3	Dodine [Dodecylguanidine monoacetate]	1.0
120-36-5	2,4-DP	0.1
1320-18-9	2,4-D propylene glycol butyl ether ester	0.1
2702-72-9	2,4-D sodium salt	0.1
106-89-8	Epichlorohydrin	0.1
13194-48-4	Ethoprop [Phosphorodithioic acid O-ethyl S,S-dipropyl ester]	1.0
110-80-5	2-Ethoxyethanol	1.0
140-88-5	Ethyl acrylate	0.1
100-41-4	Ethylbenzene	0.1
541-41-3	Ethyl chloroformate	1.0
759-94-4	Ethyl dipropylthiocarbamate (EPTC)	1.0
74-85-1	Ethylene	1.0
107-21-1	Ethylene glycol	1.0
151-56-4	Ethyleneimine (Aziridine)	0.1
75-21-8	Ethylene oxide	0.1
96-45-7	Ethylene thiourea	0.1
75-34-3	Ethylidene dichloride	1.0
52-85-7	Famphur	1.0
60168-88-9	Fenarimol [.alpha.-(2-Chlorophenyl)-.alpha.-(4-chlorophenyl)-5-pyrimidinemethanol]	1.0
13356-08-6	Fenbutatin oxide (Hexakis(2-methyl-2-phenylpropyl) distannoxane)	1.0
66441-23-4	Fenoxaprop ethyl [2-(4-((6-Chloro-2-benzoxazolylen)oxy)phenoxy)propanoic acid, ethyl ester]	1.0
72490-01-8	Fenoxycarb [[2-(4-Phenoxyphenoxy)ethyl]carbamic acid ethyl ester]	1.0
39515-41-8	Fenpropathrin [2,2,3,3-Tetramethylcyclopropane carboxylic acid cyano(3-phenoxyphenyl)methyl ester]	1.0

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Table II

CAS Number	Chemical Name	*De Minimis* Limit
55-38-9	Fenthion [O,O-Dimethyl O-[3-methyl-4-(methylthio)phenyl] ester, phosphorothioic acid]	1.0
51630-58-1	Fenvalerate [4-Chloro-alpha-(1-methylethyl) benzeneacetic acid cyano (3-phenoxyphenyl) methyl ester]	1.0
14484-64-1	Ferbam [Tris(dimethylcarbamodithioato- S,S')iron]	1.0
69806-50-4	Fluazifop butyl [2-[4-[[5-(Trifluoromethyl)-2-pyridinyl]oxy]phenoxy]propanoic acid, butyl ester]	1.0
2164-17-2	Fluometuron [Urea, N,N-dimethyl-N'-[3-(trifluoromethyl)phenyl]-]	1.0
7782-41-4	Fluorine	1.0
51-21-8	Fluorouracil (5-Fluorouracil)	1.0
69409-94-5	Fluvalinate [N-[2-Chloro-4-(trifluoromethyl)phenyl]-DL-valine(+)-cyano(3-phenoxyphenyl)methyl ester]	1.0
133-07-3	Folpet	1.0
72178-02-0	Fomesafen [5-(2-Chloro-4-(trifluoromethyl)phenoxy)-N-methylsulfonyl-2-nitrobenzamide]	1.0
50-00-0	Formaldehyde	0.1
64-18-6	Formic acid	1.0
76-13-1	Freon 113 [Ethane, 1,1,2-trichloro-1,2,2,-trifluoro-]	1.0
76-44-8	Heptachlor [1,4,5,6,7,8,8-Heptachloro-3a, 4,7,7a-tetrahydro-4,7-methano-1H-indene]	*
118-74-1	Hexachlorobenzene	*
87-68-3	Hexachloro-1,3-butadiene	1.0
319-84-6	alpha-Hexachlorocyclohexane	0.1
77-47-4	Hexachlorocyclopentadiene	1.0
67-72-1	Hexachloroethane	0.1
1335-87-1	Hexachloronaphthalene	1.0
70-30-4	Hexachlorophene	1.0
680-31-9	Hexamethylphosphoramide	0.1
110-54-3	n-Hexane	1.0
51235-04-2	Hexazinone	1.0
67485-29-4	Hydramethylnon [Tetrahydro-5,5-dimethyl-2(1H)-pyrimidinone[3-[4-(trifluoromethyl)phenyl]-1-[2-[4-(trifluoromethyl)phenyl]ethenyl]-2-propenylidene]hydrazone]	1.0
302-01-2	Hydrazine	0.1
10034-93-2	Hydrazine sulfate	0.1
7647-01-0	Hydrochloric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)	1.0
74-90-8	Hydrogen cyanide	1.0
7664-39-3	Hydrogen fluoride	1.0
123-31-9	Hydroquinone	1.0
35554-44-0	Imazalil [1-[2-(2,4-Dichlorophenyl)-2-(2-propenyloxy)ethyl]-1H-imidazole]	1.0
55406-53-6	3-Iodo-2-propynyl butylcarbamate	1.0
13463-40-6	Iron pentacarbonyl	1.0
78-84-2	Isobutyraldehyde	1.0
465-73-6	Isodrin	*
25311-71-1	Isofenphos[2-[[Ethoxyl[(1-methylethyl)amino]phosphinothioyl]oxy] benzoic acid 1-methylethyl ester]	1.0
67-63-0	Isopropyl alcohol (only persons who manufacture by the strong acid process are subject, no supplier notification)	1.0
80-05-7	4,4'-Isopropylidenediphenol	1.0
120-58-1	Isosafrole	1.0
77501-63-4	Lactofen [Benzoic acid, 5-[2-Chloro-4-(trifluoromethyl)phenoxy]-2-nitro-, 2-ethoxy-1-methyl-2-oxoethyl ester]	1.0
7439-92-1	Lead (when lead is contained in stainless steel, brass or bronze alloys the *de minimis* level is 0.1)	*
58-89-9	Lindane [Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1.alpha.,2.alpha.,3.beta.,4.alpha.,5.alpha., 6.beta.)-]	0.1
330-55-2	Linuron	1.0
554-13-2	Lithium carbonate	1.0
121-75-5	Malathion	1.0
108-31-6	Maleic anhydride	1.0
109-77-3	Malononitrile	1.0
12427-38-2	Maneb [Carbamodithioic acid, 1,2-ethanediylbis-, manganese complex]	1.0
7439-96-5	Manganese	1.0
93-65-2	Mecoprop	0.1
149-30-4	2-Mercaptobenzothiazole (MBT)	1.0
7439-97-6	Mercury	*
150-50-5	Merphos	1.0
126-98-7	Methacrylonitrile	1.0

CAS Number	Chemical Name	*De Minimis* Limit
137-42-8	Metham sodium (Sodium methyldithiocarbamate)	1.0
67-56-1	Methanol	1.0
20354-26-1	Methazole [2-(3,4-Dichlorophenyl)-4-methyl-1,2,4-oxadiazolidine-3,5-dione]	1.0
2032-65-7	Methiocarb	1.0
94-74-6	Methoxone ((4-Chloro-2-methylphenoxy) acetic acid) (MCPA)	0.1
3653-48-3	Methoxone sodium salt ((4-Chloro-2-methylphenoxy) acetate sodium salt)	0.1
72-43-5	Methoxychlor [Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-methoxy-]	*
109-86-4	2-Methoxyethanol	1.0
96-33-3	Methyl acrylate	1.0
1634-04-4	Methyl tert-butyl ether	1.0
79-22-1	Methyl chlorocarbonate	1.0
101-14-4	4,4'-Methylenebis(2-chloroaniline) (MBOCA)	0.1
101-61-1	4,4'-Methylenebis(N,N-dimethyl) benzenamine	0.1
74-95-3	Methylene bromide	1.0
101-77-9	4,4'-Methylenedianiline	0.1
60-34-4	Methyl hydrazine	1.0
74-88-4	Methyl iodide	1.0
108-10-1	Methyl isobutyl ketone	1.0
624-83-9	Methyl isocyanate	1.0
556-61-6	Methyl isothiocyanate [Isothiocyanatomethane]	1.0
75-86-5	2-Methyllactonitrile	1.0
80-62-6	Methyl methacrylate	1.0
924-42-5	N-Methylolacrylamide	1.0
298-00-0	Methyl parathion	1.0
109-06-8	2-Methylpyridine	1.0
872-50-4	N-Methyl-2-pyrrolidone	1.0
9006-42-2	Metiram	1.0
21087-64-9	Metribuzin	1.0
7786-34-7	Mevinphos	1.0
90-94-8	Michler's ketone	0.1
2212-67-1	Molinate (1H-Azepine-1-carbothioic acid, hexahydro-, S-ethyl ester)	1.0
1313-27-5	Molybdenum trioxide	1.0
76-15-3	Monochloropentafluoroethane (CFC-115)	1.0
150-68-5	Monuron	1.0
505-60-2	Mustard gas [Ethane, 1,1'-thiobis[2-chloro-]	0.1
88671-89-0	Myclobutanil [.alpha.-Butyl-.alpha.-(4-chlorophenyl)-1H-1,2,4-triazole-1-propanenitrile]	1.0
142-59-6	Nabam	1.0
300-76-5	Naled	1.0
91-20-3	Naphthalene	0.1
134-32-7	alpha-Naphthylamine	0.1
91-59-8	beta-Naphthylamine	0.1
7440-02-0	Nickel	0.1
1929-82-4	Nitrapyrin (2-Chloro-6-(trichloromethyl)pyridine)	1.0
7697-37-2	Nitric acid	1.0
139-13-9	Nitrilotriacetic acid	0.1
100-01-6	p-Nitroaniline	1.0
99-59-2	5-Nitro-o-anisidine	1.0
98-95-3	Nitrobenzene	0.1
92-93-3	4-Nitrobiphenyl	0.1
1836-75-5	Nitrofen [Benzene, 2,4-dichloro-1-(4-nitrophenoxy)-]	0.1
51-75-2	Nitrogen mustard [2-Chloro-N-(2-chloroethyl)-N-methylethanamine]	0.1
55-63-0	Nitroglycerin	1.0
88-75-5	2-Nitrophenol	1.0
100-02-7	4-Nitrophenol	1.0
79-46-9	2-Nitropropane	0.1
924-16-3	N-Nitrosodi-n-butylamine	0.1
55-18-5	N-Nitrosodiethylamine	0.1
62-75-9	N-Nitrosodimethylamine	0.1
86-30-6	N-Nitrosodiphenylamine	1.0
156-10-5	p-Nitrosodiphenylamine	1.0
621-64-7	N-Nitrosodi-n-propylamine	0.1
759-73-9	N-Nitroso-N-ethylurea	0.1
684-93-5	N-Nitroso-N-methylurea	0.1
4549-40-0	N-Nitrosomethylvinylamine	0.1
59-89-2	N-Nitrosomorpholine	0.1
16543-55-8	N-Nitrosonornicotine	0.1
100-75-4	N-Nitrosopiperidine	0.1
99-55-8	5-Nitro-o-toluidine	1.0
27314-13-2	Norflurazon [4-Chloro-5-(methylamino)-2-[3-(trifluoromethyl)phenyl]-3(2H)-pyridazinone]	1.0
2234-13-1	Octachloronaphthalene	1.0
29082-74-4	Octachlorostyrene	*
19044-88-3	Oryzalin [4-(Dipropylamino)-3,5-dinitrobenzene sulfonamide]	1.0
20816-12-0	Osmium tetroxide	1.0

CAS Number	Chemical Name	*De Minimis* Limit
301-12-2	Oxydemeton methyl [S-(2-(Ethylsulfinyl)ethyl) O,O-dimethyl ester phosphorothioic acid]	1.0
19666-30-9	Oxydiazon [3-[2,4-Dichloro-5-(1-methylethoxy)phenyl]- 5-(1,1-dimethylethyl)-1,3,4-oxadiazol-2(3H)-one]	1.0
42874-03-3	Oxyfluorfen	1.0
10028-15-6	Ozone	1.0
123-63-7	Paraldehyde	1.0
1910-42-5	Paraquat dichloride	1.0
56-38-2	Parathion [Phosphorothioic acid, O,O-diethyl-O-(4-nitrophenyl)ester]	1.0
1114-71-2	Pebulate [Butylethylcarbamothioic acid S-propyl ester]	1.0
40487-42-1	Pendimethalin [N-(1-Ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine]	*
608-93-5	Pentachlorobenzene	*
76-01-7	Pentachloroethane	1.0
87-86-5	Pentachlorophenol (PCP)	0.1
57-33-0	Pentobarbital sodium	1.0
79-21-0	Peracetic acid	1.0
594-42-3	Perchloromethyl mercaptan	1.0
52645-53-1	Permethrin [3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid, (3-phenoxyphenyl) methyl ester]	1.0
85-01-8	Phenanthrene	1.0
108-95-2	Phenol	1.0
26002-80-2	Phenothrin [2,2-Dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid (3-phenoxyphenyl)methyl ester]	1.0
95-54-5	1,2-Phenylenediamine	1.0
108-45-2	1,3-Phenylenediamine	1.0
106-50-3	p-Phenylenediamine	1.0
615-28-1	1,2-Phenylenediamine dihydrochloride	1.0
624-18-0	1,4-Phenylenediamine dihydrochloride	1.0
90-43-7	2-Phenylphenol	1.0
57-41-0	Phenytoin	0.1
75-44-5	Phosgene	1.0
7803-51-2	Phosphine	1.0
7723-14-0	Phosphorus (yellow or white)	1.0
85-44-9	Phthalic anhydride	1.0
1918-02-1	Picloram	1.0
88-89-1	Picric acid	1.0
51-03-6	Piperonyl butoxide	1.0
29232-93-7	Pirimiphos methyl [O-(2-(Diethylamino)-6-methyl-4-pyrimidinyl)-O,O-dimethylphosphorothioate]	1.0
1336-36-3	Polychlorinated biphenyls (PCBs)	*
7758-01-2	Potassium bromate	0.1
128-03-0	Potassium dimethyldithiocarbamate	1.0
137-41-7	Potassium N-methyldithiocarbamate	1.0
41198-08-7	Profenofos [O-(4-Bromo-2-chlorophenyl)-O-ethyl-S-propyl phosphorothioate]	1.0
7287-19-6	Prometryn [N,N'-Bis(1-methylethyl)-6-methylthio-1,3,5-triazine-2,4-diamine]	1.0
23950-58-5	Pronamide	1.0
1918-16-7	Propachlor [2-Chloro-N-(1-methylethyl)-N-phenylacetamide]	1.0
1120-71-4	Propane sultone	0.1
709-98-8	Propanil [N-(3,4-Dichlorophenyl)propanamide]	1.0
2312-35-8	Propargite	1.0
107-19-7	Propargyl alcohol	1.0
31218-83-4	Propetamphos [3-[(Ethylamino)methoxyphosphinothioyl] oxy]-2-butenoic acid, 1-methylethyl ester]	1.0
60207-90-1	Propiconazole [1-[2-(2,4-Dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]-methyl-1H-1,2,4,-triazole]	1.0
57-57-8	beta-Propiolactone	0.1
123-38-6	Propionaldehyde	1.0
114-26-1	Propoxur [Phenol, 2-(1-methylethoxy)-, methylcarbamate]	1.0
115-07-1	Propylene (Propene)	1.0
75-55-8	Propyleneimine	0.1
75-56-9	Propylene oxide	0.1
110-86-1	Pyridine	1.0
91-22-5	Quinoline	1.0
106-51-4	Quinone	1.0
82-68-8	Quintozene (Pentachloronitrobenzene)	1.0
76578-14-8	Quizalofop-ethyl [2-[4-[(6-Chloro-2-quinoxalinyl)oxy]phenoxy] propanoic acid ethyl ester]	1.0

CAS Number	Chemical Name	De Minimis Limit
10453-86-8	Resmethrin [[5-(Phenylmethyl)-3-furanyl]methyl-2,2-dimethyl-3-(2-methyl-1-propenyl) cyclopropanecarboxylate]	1.0
81-07-2	Saccharin (only persons who manufacture are subject, no supplier notification)	1.0
94-59-7	Safrole	0.1
7782-49-2	Selenium	1.0
74051-80-2	Sethoxydim [2-[1-(Ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxyl-2-cyclohexen-1-one]	1.0
7440-22-4	Silver	1.0
122-34-9	Simazine	1.0
26628-22-8	Sodium azide	1.0
1982-69-0	Sodium dicamba [3,6-Dichloro-2-methoxybenzoic acid, sodium salt]	1.0
128-04-1	Sodium dimethyldithiocarbamate	1.0
62-74-8	Sodium fluoroacetate	1.0
7632-00-0	Sodium nitrite	1.0
131-52-2	Sodium pentachlorophenate	1.0
132-27-4	Sodium o-phenylphenoxide	0.1
100-42-5	Styrene	0.1
96-09-3	Styrene oxide	0.1
7664-93-9	Sulfuric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)	1.0
2699-79-8	Sulfuryl fluoride (Vikane)	1.0
35400-43-2	Sulprofos [O-Ethyl O-[4-(methylthio)phenyl] phosphorodithioic acid S-propylester]	1.0
34014-18-1	Tebuthiuron [N-[5-(1,1-Dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea]	1.0
3383-96-8	Temephos	1.0
5902-51-2	Terbacil [5-Chloro-3-(1,1-dimethylethyl)-6-methyl-2,4(1H,3H)-pyrimidinedione]	1.0
79-94-7	Tetrabromobisphenol A	*
630-20-6	1,1,1,2-Tetrachloroethane	1.0
79-34-5	1,1,2,2-Tetrachloroethane	1.0
127-18-4	Tetrachloroethylene (Perchloroethylene)	0.1
354-11-0	1,1,1,2-Tetrachloro-2-fluoroethane (HCFC-121a)	1.0
354-14-3	1,1,2,2-Tetrachloro-1-fluoroethane (HCFC-121)	1.0
961-11-5	Tetrachlorvinphos [Phosphoric acid, 2-chloro-1-(2,4,5-trichlorophenyl) ethenyl dimethyl ester]	1.0
64-75-5	Tetracycline hydrochloride	1.0
7696-12-0	Tetramethrin [2,2-Dimethyl-3-(2-methyl-1-propenyl) cyclopropanecarboxylic acid (1,3,4,5,6,7-hexahydro-1,3-dioxo-2H-isoindol-2-yl)methyl ester]	1.0
7440-28-0	Thallium	1.0
148-79-8	Thiabendazole [2-(4-Thiazolyl)-1H-benzimidazole]	1.0
62-55-5	Thioacetamide	0.1
28249-77-6	Thiobencarb [Carbamic acid, diethylthio-, S-(p-chlorobenzyl)ester]	1.0
139-65-1	4,4'-Thiodianiline	0.1
59669-26-0	Thiodicarb	1.0
23564-06-9	Thiophanate ethyl [[1,2-Phenylenebis(iminocarbonothioyl)] biscarbamic acid diethylester]	1.0
23564-05-8	Thiophanate methyl	1.0
79-19-6	Thiosemicarbazide	1.0
62-56-6	Thiourea	0.1
137-26-8	Thiram	1.0
1314-20-1	Thorium dioxide	1.0
7550-45-0	Titanium tetrachloride	1.0
108-88-3	Toluene	1.0
584-84-9	Toluene-2,4-diisocyanate	0.1
91-08-7	Toluene-2,6-diisocyanate	0.1
26471-62-5	Toluene diisocyanate (mixed isomers)	0.1
95-53-4	o-Toluidine	0.1
636-21-5	o-Toluidine hydrochloride	0.1
8001-35-2	Toxaphene	*
43121-43-3	Triadimefon [1-(4-Chlorophenoxy)-3,3-di-methyl-1-(1H-1,2,4- triazol-1-yl)-2-butanone]	1.0
2303-17-5	Triallate	1.0
68-76-8	Triaziquone [2,5-Cyclohexadiene-1,4-dione, 2,3,5-tris(1-aziridinyl)-]	1.0
101200-48-0	Tribenuron methyl [2-[[[[(4-Methoxy-6-methyl-1,3,5-triazin-2-yl)-methylamino]-carbonyl]amino]sulfonyl] benzoic acid methyl ester)	1.0
1983-10-4	Tributyltin fluoride	1.0
2155-70-6	Tributyltin methacrylate	1.0
78-48-8	S,S,S-Tributyltrithio-phosphate (DEF)	1.0

CAS Number	Chemical Name	De Minimis Limit
52-68-6	Trichlorfon [Phosphoric acid,(2,2,2-trichloro-l-hydroxy-ethyl)-, dimethyl ester]	1.0
76-02-8	Trichloroacetyl chloride	1.0
120-82-1	1,2,4-Trichlorobenzene	1.0
71-55-6	1,1,1-Trichloroethane (Methyl chloroform)	1.0
79-00-5	1,1,2-Trichloroethane	1.0
79-01-6	Trichloroethylene	0.1
75-69-4	Trichlorofluoromethane (CFC-11)	1.0
95-95-4	2,4,5-Trichlorophenol	1.0
88-06-2	2,4,6-Trichlorophenol	0.1
96-18-4	1,2,3-Trichloropropane	0.1
57213-69-1	Triclopyr triethylammonium salt	1.0
121-44-8	Triethylamine	1.0
1582-09-8	Trifluralin [Benezeneamine, 2,6-dinitro-N,N-dipropyl-4-(trifluoromethyl)-]	*
26644-46-2	Triforine [N,N'-[1,4-Piperazinediylbis-(2,2,2-trichloroethylidene)]bisformamide]	1.0
95-63-6	1,2,4-Trimethylbenzene	1.0
2655-15-4	2,3,5-Trimethylphenyl methylcarbamate	1.0
639-58-7	Triphenyltin chloride	1.0
76-87-9	Triphenyltin hydroxide	1.0
126-72-7	Tris(2,3-dibromopropyl) phosphate	0.1
72-57-1	Trypan blue	0.1
51-79-6	Urethane (Ethyl carbamate)	0.1
7440-62-2	Vanadium (except when contained in an alloy)	1.0
50471-44-8	Vinclozolin [3-(3,5-Dichlorophenyl)-5-ethenyl-5-methyl-2,4-oxazolidinedione]	1.0
108-05-4	Vinyl acetate	0.1
593-60-2	Vinyl bromide	0.1
75-01-4	Vinyl chloride	0.1
75-35-4	Vinylidene chloride	1.0
108-38-3	m-Xylene	1.0
95-47-6	o-Xylene	1.0
106-42-3	p-Xylene	1.0
1330-20-7	Xylene (mixed isomers)	1.0
87-62-7	2,6-Xylidine	0.1
7440-66-6	Zinc (fume or dust)	1.0
12122-67-7	Zineb [Carbamodithioic acid, 1,2-ethanediyibis-, zinc complex]	1.0

b. Individually Listed Toxic Chemicals Arranged by CAS Number

CAS Number	Chemical Name	De Minimis Limit
50-00-0	Formaldehyde	0.1
51-03-6	Piperonyl butoxide	1.0
51-21-8	Fluorouracil (5-Fluorouracil)	1.0
51-28-5	2,4-Dinitrophenol	1.0
51-75-2	Nitrogen mustard [2-Chloro-N-(2-chloroethyl)-N-methylethanamine]	0.1
51-79-6	Urethane (Ethyl carbamate)	0.1
52-68-6	Trichlorfon [Phosphonic acid, (2,2,2-trichloro-1-hydroxyethyl)-, dimethyl ester]	1.0
52-85-7 Famphur1.0		
53-96-3	2-Acetylaminofluorene	0.1
55-18-5	N-Nitrosodiethylamine	0.1
55-21-0	Benzamide	1.0
55-38-9	Fenthion [O,O-Dimethyl O-[3-methyl-4-(methylthio)phenyl] ester, phosphorothioic acid]	1.0
55-63-0	Nitroglycerin	1.0
56-23-5	Carbon tetrachloride	0.1
56-35-9	Bis(tributyltin) oxide	1.0
56-38-2	Parathion [Phosphorothioic acid, O,O-diethyl-O-(4-nitrophenyl) ester]	1.0
57-14-7	1,1-Dimethylhydrazine	0.1
57-33-0	Pentobarbital sodium	1.0
57-41-0	Phenytoin	0.1
57-57-8	beta-Propiolactone	0.1
57-74-9	Chlordane [4,7-Methanoindan, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-]	*
58-89-9	Lindane [Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1.alpha.,2.alpha.,3.beta.,4.alpha, 5.alpha.,6.beta.)-]	0.1
59-89-2	N-Nitrosomorpholine	0.1
60-09-3	4-Aminoazobenzene	0.1
60-11-7	4-Dimethylaminoazobenzene	0.1
60-34-4	Methyl hydrazine	1.0
60-35-5	Acetamide	0.1
60-51-5	Dimethoate	1.0
61-82-5	Amitrole	0.1
62-53-3	Aniline	1.0
62-55-5	Thioacetamide	0.1

CAS Number	Chemical Name	*De Minimis* Limit
62-56-6	Thiourea	0.1
62-73-7	Dichlorvos [Phosphoric acid, 2,2-dichloroethenyl dimethyl ester]	0.1
62-74-8	Sodium fluoroacetate	1.0
62-75-9	N-Nitrosodimethylamine	0.1
63-25-2	Carbaryl [1-Naphthalenol, methylcarbamate]	1.0
64-18-6	Formic acid	1.0
64-67-5	Diethyl sulfate	0.1
64-75-5	Tetracycline hydrochloride	1.0
67-56-1	Methanol	1.0
67-63-0	Isopropyl alcohol (only persons who manufacture by the strong acid process are subject, no supplier notification)	1.0
67-66-3	Chloroform	0.1
67-72-1	Hexachloroethane	0.1
68-12-2	N,N-Dimethylformamide	1.0
68-76-8	Triaziquone [2,5-Cyclohexadiene-1,4-dione, 2,3,5-tris(1-aziridinyl)-]	1.0
70-30-4	Hexachlorophene	1.0
71-36-3	n-Butyl alcohol	1.0
71-43-2	Benzene	0.1
71-55-6	1,1,1-Trichloroethane (Methyl chloroform)	1.0
72-43-5	Methoxychlor [Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-methoxy-]	*
72-57-1	Trypan blue	0.1
74-83-9	Bromomethane (Methyl bromide)	1.0
74-85-1	Ethylene	1.0
74-87-3	Chloromethane (Methyl chloride)	1.0
74-88-4	Methyl iodide	1.0
74-90-8	Hydrogen cyanide	1.0
74-95-3	Methylene bromide	1.0
75-00-3	Chloroethane (Ethyl chloride)	1.0
75-01-4	Vinyl chloride	0.1
75-05-8	Acetonitrile	1.0
75-07-0	Acetaldehyde	0.1
75-09-2	Dichloromethane (Methylene chloride)	0.1
75-15-0	Carbon disulfide	1.0
75-21-8	Ethylene oxide	0.1
75-25-2	Bromoform (Tribromomethane)	1.0
75-27-4	Dichlorobromomethane	0.1
75-34-3	Ethylidene dichloride	1.0
75-35-4	Vinylidene chloride	1.0
75-43-4	Dichlorofluoromethane (HCFC-21)	1.0

CAS Number	Chemical Name	*De Minimis* Limit
75-44-5	Phosgene	1.0
75-45-6	Chlorodifluoromethane (HCFC-22)	1.0
75-55-8	Propyleneimine	0.1
75-56-9	Propylene oxide	0.1
75-63-8	Bromotrifluoromethane (Halon 1301)	1.0
75-65-0	tert-Butyl alcohol	1.0
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	1.0
75-69-4	Trichlorofluoromethane (CFC-11)	1.0
75-71-8	Dichlorodifluoromethane (CFC-12)	1.0
75-72-9	Chlorotrifluoromethane (CFC-13)	1.0
75-86-5	2-Methyllactonitrile	1.0
75-88-7	2-Chloro-1,1,1-trifluoroethane (HCFC-133a)	1.0
76-01-7	Pentachloroethane	1.0
76-02-8	Trichloroacetyl chloride	1.0
76-06-2	Chloropicrin	1.0
76-13-1	Freon 113 [Ethane, 1,1,2-trichloro-1,2,2,-trifluoro-]	1.0
76-14-2	Dichlorotetrafluoroethane (CFC-114)	1.0
76-15-3	Monochloropentafluoroethane (CFC-115)	1.0
76-44-8	Heptachlor [1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methano-1H-indene]	*
76-87-9	Triphenyltin hydroxide	1.0
77-47-4	Hexachlorocyclopentadiene	1.0
77-73-6	Dicyclopentadiene	1.0
77-78-1	Dimethyl sulfate	0.1
78-48-8	S,S,S-Tributyltrithiophosphate (DEF)	1.0
78-84-2	Isobutyraldehyde	1.0
78-87-5	1,2-Dichloropropane	1.0
78-88-6	2,3-Dichloropropene	1.0
78-92-2	sec-Butyl alcohol	1.0
79-00-5	1,1,2-Trichloroethane	1.0
79-01-6	Trichloroethylene	0.1
79-06-1	Acrylamide	0.1
79-10-7	Acrylic acid	1.0
79-11-8	Chloroacetic acid	1.0
79-19-6	Thiosemicarbazide	1.0
79-21-0	Peracetic acid	1.0
79-22-1	Methyl chlorocarbonate	1.0
79-34-5	1,1,2,2-Tetrachloroethane	1.0
79-44-7	Dimethylcarbamyl chloride	0.1
79-46-9	2-Nitropropane	0.1

CAS Number	Chemical Name	*De Minimis* Limit
79-94-7	Tetrabromobisphenol A	*
80-05-7	4,4'-Isopropylidenediphenol	1.0
80-15-9	Cumene hydroperoxide	1.0
80-62-6	Methyl methacrylate	1.0
81-07-2	Saccharin (only persons who manufacture are subject, no supplier notification)	1.0
81-88-9	C.I. Food Red 15	1.0
82-28-0	1-Amino-2-methylanthraquinone	0.1
82-68-8	Quintozene [Pentachloronitrobenzene]	1.0
84-74-2	Dibutyl phthalate	1.0
85-01-8	Phenanthrene	1.0
85-44-9	Phthalic anhydride	1.0
86-30-6	N-Nitrosodiphenylamine	1.0
87-62-7	2,6-Xylidine	0.1
87-68-3	Hexachloro-1,3-butadiene	1.0
87-86-5	Pentachlorophenol (PCP)	0.1
88-06-2	2,4,6-Trichlorophenol	0.1
88-75-5	2-Nitrophenol	1.0
88-85-7	Dinitrobutyl phenol (Dinoseb)	1.0
88-89-1	Picric acid	1.0
90-04-0	o-Anisidine	0.1
90-43-7	2-Phenylphenol	1.0
90-94-8	Michler's ketone	0.1
91-08-7	Toluene-2,6-diisocyanate	0.1
91-20-3	Naphthalene	0.1
91-22-5	Quinoline	1.0
91-59-8	beta-Naphthylamine	0.1
91-94-1	3,3'-Dichlorobenzidine	0.1
92-52-4	Biphenyl	1.0
92-67-1	4-Aminobiphenyl	0.1
92-87-5	Benzidine	0.1
92-93-3	4-Nitrobiphenyl	0.1
93-65-2	Mecoprop	0.1
94-11-1	2,4-D isopropyl ester	0.1
94-36-0	Benzoyl peroxide	1.0
94-58-6	Dihydrosafrole	0.1
94-59-7	Safrole	0.1
94-74-6	Methoxone ((4-Chloro-2-methylphenoxy) acetic acid) (MCPA)	0.1
94-75-7	2,4-D [Acetic acid, (2,4-dichlorophenoxy)-]	0.1
94-80-4	2,4-D butyl ester	0.1
94-82-6	2,4-DB	1.0
95-47-6	o-Xylene	1.0
95-48-7	o-Cresol	1.0
95-50-1	1,2-Dichlorobenzene	1.0
95-53-4	o-Toluidine	0.1
95-54-5	1,2-Phenylenediamine	1.0
95-63-6	1,2,4-Trimethylbenzene	1.0

CAS Number	Chemical Name	*De Minimis* Limit
95-69-2	p-Chloro-o-toluidine	0.1
95-80-7	2,4-Diaminotoluene	0.1
95-95-4	2,4,5-Trichlorophenol	1.0
96-09-3	Styrene oxide	0.1
96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	0.1
96-18-4	1,2,3-Trichloropropane	0.1
96-33-3	Methyl acrylate	1.0
96-45-7	Ethylene thiourea	0.1
97-23-4	Dichlorophene [2,2'-Methylenebis(4-chlorophenol)]	1.0
97-56-3	C.I. Solvent Yellow 3	0.1
98-07-7	Benzoic trichloride (Benzotrichloride)	0.1
98-82-8	Cumene	1.0
98-86-2	Acetophenone	1.0
98-87-3	Benzal chloride	1.0
98-88-4	Benzoyl chloride	1.0
98-95-3	Nitrobenzene	0.1
99-30-9	Dichloran [2,6-Dichloro-4-nitroaniline]	1.0
99-55-8	5-Nitro-o-toluidine	1.0
99-59-2	5-Nitro-o-anisidine	1.0
99-65-0	m-Dinitrobenzene	1.0
100-01-6	p-Nitroaniline	1.0
100-02-7	4-Nitrophenol	1.0
100-25-4	p-Dinitrobenzene	1.0
100-41-4	Ethylbenzene	0.1
100-42-5	Styrene	0.1
100-44-7	Benzyl chloride	1.0
100-75-4	N-Nitrosopiperidine	0.1
101-05-3	Anilazine [4,6-Dichloro-N-(2-chlorophenyl)-1,3,5-triazin-2-amine]	1.0
101-14-4	4,4'-Methylenebis(2-chloroaniline) (MBOCA)	0.1
101-61-1	4,4'-Methylenebis(N,N-dimethyl)benzenamine	0.1
101-77-9	4,4'-Methylenedianiline	0.1
101-80-4	4,4'-Diaminodiphenyl ether	0.1
101-90-6	Diglycidyl resorcinol ether	0.1
104-12-1	p-Chlorophenyl isocyanate	1.0
104-94-9	p-Anisidine	1.0
105-67-9	2,4-Dimethylphenol	1.0
106-42-3	p-Xylene	1.0
106-44-5	p-Cresol	1.0
106-46-7	1,4-Dichlorobenzene	0.1
106-47-8	p-Chloroaniline	0.1
106-50-3	p-Phenylenediamine	1.0
106-51-4	Quinone	1.0

CAS Number	Chemical Name	*De Minimis* Limit
106-88-7	1,2-Butylene oxide	0.1
106-89-8	Epichlorohydrin	0.1
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.1
106-99-0	1,3-Butadiene	0.1
107-02-8	Acrolein	1.0
107-05-1	Allyl chloride	1.0
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	0.1
107-11-9	Allylamine	1.0
107-13-1	Acrylonitrile	0.1
107-18-6	Allyl alcohol	1.0
107-19-7	Propargyl alcohol	1.0
107-21-1	Ethylene glycol	1.0
107-30-2	Chloromethyl methyl ether	0.1
108-05-4	Vinyl acetate	0.1
108-10-1	Methyl isobutyl ketone	1.0
108-31-6	Maleic anhydride	1.0
108-38-3	m-Xylene	1.0
108-39-4	m-Cresol	1.0
108-45-2	1,3-Phenylenediamine	1.0
108-60-1	Bis(2-chloro-1-methylethyl) ether	1.0
108-88-3	Toluene	1.0
108-90-7	Chlorobenzene	1.0
108-93-0	Cyclohexanol	1.0
108-95-2	Phenol	1.0
109-06-8	2-Methylpyridine	1.0
109-77-3	Malononitrile	1.0
109-86-4	2-Methoxyethanol	1.0
110-54-3	n-Hexane	1.0
110-57-6	trans-1,4-Dichloro-2-butene	1.0
110-80-5	2-Ethoxyethanol	1.0
110-82-7	Cyclohexane	1.0
110-86-1	Pyridine	1.0
111-42-2	Diethanolamine	1.0
111-44-4	Bis(2-chloroethyl) ether	1.0
111-91-1	Bis(2-chloroethoxy) methane	1.0
114-26-1	Propoxur [Phenol, 2-(1-methylethoxy)-, methylcarbamate]	1.0
115-07-1	Propylene (Propene)	1.0
115-28-6	Chlorendic acid	0.1
115-32-2	Dicofol [Benzenemethanol, 4-chloro-.alpha.-4-(chlorophenyl)-.alpha.-(trichloromethyl)-]	1.0
116-06-3	Aldicarb	1.0
117-79-3	2-Aminoanthraquinone	0.1
117-81-7	Di(2-ethylhexyl) phthalate	0.1
118-74-1	Hexachlorobenzene	*
119-90-4	3,3'-Dimethoxybenzidine	0.1

CAS Number	Chemical Name	*De Minimis* Limit
119-93-7	3,3'-Dimethylbenzidine (o-Tolidine)	0.1
120-12-7	Anthracene	1.0
120-36-5	2,4-DP	0.1
120-58-1	Isosafrole	1.0
120-71-8	p-Cresidine	0.1
120-80-9	Catechol	0.1
120-82-1	1,2,4-Trichlorobenzene	1.0
120-83-2	2,4-Dichlorophenol	1.0
121-14-2	2,4-Dinitrotoluene	0.1
121-44-8	Triethylamine	1.0
121-69-7	N,N-Dimethylaniline	1.0
121-75-5	Malathion	1.0
122-34-9	Simazine	1.0
122-39-4	Diphenylamine	1.0
122-66-7	1,2-Diphenylhydrazine (Hydrazobenzene)	0.1
123-31-9	Hydroquinone	1.0
123-38-6	Propionaldehyde	1.0
123-63-7	Paraldehyde	1.0
123-72-8	Butyraldehyde	1.0
123-91-1	1,4-Dioxane	0.1
124-40-3	Dimethylamine	1.0
124-73-2	Dibromotetrafluoroethane (Halon 2402)	1.0
126-72-7	Tris(2,3-dibromopropyl) phosphate	0.1
126-98-7	Methacrylonitrile	1.0
126-99-8	Chloroprene	0.1
127-18-4	Tetrachloroethylene (Perchloroethylene)	0.1
128-03-0	Potassium dimethyldithiocarbamate	1.0
128-04-1	Sodium dimethyldithiocarbamate	1.0
128-66-5	C.I. Vat Yellow 4	1.0
131-11-3	Dimethyl phthalate	1.0
131-52-2	Sodium pentachlorophenate	1.0
132-27-4	Sodium o-phenylphenoxide	0.1
132-64-9	Dibenzofuran	1.0
133-06-2	Captan [1H-Isoindole-1,3(2H)-dione, 3a,4,7,7a-tetrahydro-2-[(trichloromethyl)thio]-]	1.0
133-07-3	Folpet	1.0
133-90-4	Chloramben [Benzoic acid, 3-amino-2,5-dichloro-]	1.0
134-29-2	o-Anisidine hydrochloride	0.1
134-32-7	alpha-Naphthylamine	0.1
135-20-6	Cupferron [Benzeneamine, N-hydroxy-N-nitroso, ammonium salt]	0.1
136-45-8	Dipropyl isocinchomeronate	1.0

Table II

CAS Number	Chemical Name	*De Minimis* Limit
137-26-8	Thiram	1.0
137-41-7	Potassium N-methyldithio-carbamate	1.0
137-42-8	Metham sodium (Sodium methyldithiocarbamate)	1.0
138-93-2	Disodium cyanodithioimido-carbonate	1.0
139-13-9	Nitrilotriacetic acid	0.1
139-65-1	4,4'-Thiodianiline	0.1
140-88-5	Ethyl acrylate	0.1
141-32-2	Butyl acrylate	1.0
142-59-6	Nabam	1.0
148-79-8	Thiabendazole [2-(4-Thiazolyl)-1H-benzimidazole]	1.0
149-30-4	2-Mercaptobenzothiazole (MBT)	1.0
150-50-5	Merphos	1.0
150-68-5	Monuron	1.0
151-56-4	Ethyleneimine (Aziridine)	0.1
156-10-5	p-Nitrosodiphenylamine	1.0
156-62-7	Calcium cyanamide	1.0
191-24-2	Benzo(g,h,i)perylene	*
298-00-0	Methyl parathion	1.0
300-76-5	Naled	1.0
301-12-2	Oxydemeton methyl [S-(2-(Ethylsulfinyl)ethyl) O,O-dimethyl ester phosphorothioic acid]	1.0
302-01-2	Hydrazine	0.1
306-83-2	2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	1.0
309-00-2	Aldrin [1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-(1.alpha.,4.alpha.,4a.beta., 5.alpha.,8.alpha.,8a.beta.)-]	*
314-40-9	Bromacil (5-Bromo-6-methyl-3-(1-methylpropyl)-2,4(1H,3H)-pyrimidinedione)	1.0
319-84-6	alpha-Hexachlorocyclohexane	0.1
330-54-1	Diuron	1.0
330-55-2	Linuron	1.0
333-41-5	Diazinon	1.0
334-88-3	Diazomethane	1.0
353-59-3	Bromochlorodifluoromethane (Halon 1211)	1.0
354-11-0	1,1,1,2-Tetrachloro-2-fluoroethane (HCFC-121a)	1.0
354-14-3	1,1,2,2-Tetrachloro-1-fluoroethane (HCFC-121)	1.0
354-23-4	1,2-Dichloro-1,1,2-trifluoroethane (HCFC-123a)	1.0
354-25-6	1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	1.0
357-57-3	Brucine	1.0
422-44-6	1,2-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225bb)	1.0
422-48-0	2,3-Dichloro-1,1,1,2,3-pentafluoropropane (HCFC-225ba)	1.0
422-56-0	3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca)	1.0
431-86-7	1,2-Dichloro-1,1,3,3,3-pentafluoropropane (HCFC-225da)	1.0
460-35-5	3-Chloro-1,1,1-trifluoropropane (HCFC-253fb)	1.0
463-58-1	Carbonyl sulfide	1.0
465-73-6	Isodrin	*
492-80-8	C.I. Solvent Yellow 34 (Auramine)	0.1
505-60-2	Mustard gas [Ethane, 1,1'-thiobis[2-chloro-]	0.1
507-55-1	1,3-Dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb)	1.0
510-15-6	Chlorobenzilate [Benzeneacetic acid, 4-chloro-.alpha.-(4-chlorophenyl)-.alpha.-hydroxy-, ethyl ester]	1.0
528-29-0	o-Dinitrobenzene	1.0
532-27-4	2-Chloroacetophenone	1.0
533-74-4	Dazomet (Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione)	1.0
534-52-1	4,6-Dinitro-o-cresol	1.0
540-59-0	1,2-Dichloroethylene	1.0
541-41-3	Ethyl chloroformate	1.0
541-53-7	2,4-Dithiobiuret	1.0
541-73-1	1,3-Dichlorobenzene	1.0
542-75-6	1,3-Dichloropropylene	0.1
542-76-7	3-Chloropropionitrile	1.0
542-88-1	Bis(chloromethyl) ether	0.1
554-13-2	Lithium carbonate	1.0
556-61-6	Methyl isothiocyanate [Isothiocyanatomethane]	1.0
563-47-3	3-Chloro-2-methyl-1-propene	0.1
569-64-2	C.I. Basic Green 4	1.0
584-84-9	Toluene-2,4-diisocyanate	0.1
593-60-2	Vinyl bromide	0.1
594-42-3	Perchloromethyl mercaptan	1.0
606-20-2	2,6-Dinitrotoluene	0.1
608-93-5	Pentachlorobenzene	*
612-82-8	3,3'-Dimethylbenzidine dihydrochloride (o-Tolidine dihydrochloride)	0.1
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	0.1

CAS Number	Chemical Name	De Minimis Limit
615-05-4	2,4-Diaminoanisole	0.1
615-28-1	1,2-Phenylenediamine dihydrochloride	1.0
621-64-7	N-Nitrosodi-n-propylamine	0.1
624-18-0	1,4-Phenylenediamine dihydrochloride	1.0
624-83-9	Methyl isocyanate	1.0
630-20-6	1,1,1,2-Tetrachloroethane	1.0
636-21-5	o-Toluidine hydrochloride	0.1
639-58-7	Triphenyltin chloride	1.0
680-31-9	Hexamethylphosphoramide	0.1
684-93-5	N-Nitroso-N-methylurea	0.1
709-98-8	Propanil (N-(3,4-Dichlorophenyl) propanamide)	1.0
759-73-9	N-Nitroso-N-ethylurea	0.1
759-94-4	Ethyl dipropylthiocarbamate (EPTC)	1.0
764-41-0	1,4-Dichloro-2-butene	1.0
812-04-4	1,1-Dichloro-1,2,2-trifluoroethane (HCFC-123b)	1.0
834-12-8	Ametryn (N-Ethyl-N'-(1-methylethyl)-6-(methylthio)-1,3,5,-triazine-2,4-diamine)	1.0
842-07-9	C.I. Solvent Yellow 14	1.0
872-50-4	N-Methyl-2-pyrrolidone	1.0
924-16-3	N-Nitrosodi-n-butylamine	0.1
924-42-5	N-Methylolacrylamide	1.0
957-51-7	Diphenamid	1.0
961-11-5	Tetrachlorvinphos [Phosphoric acid, 2-chloro-1-(2,4,5-trichlorophenyl)ethenyldimethyl ester]	1.0
989-38-8	C.I. Basic Red 1	1.0
1114-71-2	Pebulate [Butylethylcarbamothioic acid S-propyl ester]	1.0
1120-71-4	Propane sultone	0.1
1134-23-2	Cycloate	1.0
1163-19-5	Decabromodiphenyl oxide	1.0
1313-27-5	Molybdenum trioxide	1.0
1314-20-1	Thorium dioxide	1.0
1319-77-3	Cresol (mixed isomers)	1.0
1320-18-9	2,4-D propylene glycol butyl ether ester	0.1
1330-20-7	Xylene (mixed isomers)	1.0
1332-21-4	Asbestos (friable)	0.1
1335-87-1	Hexachloronaphthalene	1.0
1336-36-3	Polychlorinated biphenyls (PCBs)	*
1344-28-1	Aluminum oxide (fibrous forms)	1.0
1464-53-5	Diepoxybutane	0.1
1563-66-2	Carbofuran	1.0
1582-09-8	Trifluralin [Benezeneamine, 2,6-dinitro-N,N-dipropyl-4-(trifluoromethyl)-]	*
1634-04-4	Methyl tert-butyl ether	1.0
1649-08-7	1,2-Dichloro-1,1-difluoroethane (HCFC-132b)	1.0
1689-84-5	Bromoxynil (3,5-Dibromo-4-hydroxybenzonitrile)	1.0
1689-99-2	Bromoxynil octanoate (Octanoic acid, 2,6-dibromo-4-cyanophenyl ester)	1.0
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	1.0
1836-75-5	Nitrofen [Benzene, 2,4-dichloro-1-(4-nitrophenoxy)-]	0.1
1861-40-1	Benfluralin (N-Butyl-N-ethyl-2,6-dinitro-4-(trifluoromethyl)benzenamine)	1.0
1897-45-6	Chlorothalonil [1,3-Benzenedicarbonitrile, 2,4,5,6-tetrachloro-]	0.1
1910-42-5	Paraquat dichloride	1.0
1912-24-9	Atrazine (6-Chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine)	1.0
1918-00-9	Dicamba (3,6-Dichloro-2-methoxybenzoic acid)	1.0
1918-02-1	Picloram	1.0
1918-16-7	Propachlor [2-Chloro-N-(1-methylethyl)-N-phenylacetamide]	1.0
1928-43-4	2,4-D 2-ethylhexyl ester	0.1
1929-73-3	2,4-D butoxyethyl ester	0.1
1929-82-4	Nitrapyrin (2-Chloro-6-(trichloromethyl)pyridine)	1.0
1937-37-7	C.I. Direct Black 38	0.1
1982-69-0	Sodium dicamba [3,6-Dichloro-2-methoxybenzoic acid, sodium salt]	1.0
1983-10-4	Tributyltin fluoride	1.0
2032-65-7	Methiocarb	1.0
2155-70-6	Tributyltin methacrylate	1.0
2164-07-0	Dipotassium endothall [7-Oxabicyclo(2.2.1)heptane-2,3-dicarboxylic acid, dipotassium salt]	1.0
2164-17-2	Fluometuron [Urea, N,N-dimethyl-N'-[3-(trifluoromethyl)phenyl]-]	1.0
2212-67-1	Molinate (1H-Azepine-1-carbothioic acid, hexahydro-S-ethyl ester)	1.0

Table II

CAS Number	Chemical Name	*De Minimis* Limit
2234-13-1	Octachloronaphthalene	1.0
2300-66-5	Dimethylamine dicamba	1.0
2303-16-4	Diallate [Carbamothioic acid, bis(1-methylethyl)-S-(2,3-dichloro-2-propenyl) ester]	1.0
2303-17-5	Triallate	1.0
2312-35-8	Propargite	1.0
2439-01-2	Chinomethionat [6-Methyl-1,3-dithiolo[4,5-b]quinoxalin-2-one]	1.0
2439-10-3	Dodine [Dodecylguanidine monoacetate]	1.0
2524-03-0	Dimethyl chlorothiophosphate	1.0
2602-46-2	C.I. Direct Blue 6	0.1
2655-15-4	2,3,5-Trimethylphenyl methyl carbamate	1.0
2699-79-8	Sulfuryl fluoride (Vikane)	1.0
2702-72-9	2,4-D sodium salt	0.1
2832-40-8	C.I. Disperse Yellow 3	1.0
2837-89-0	2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	1.0
2971-38-2	2,4-D Chlorocrotyl ester	0.1
3118-97-6	C.I. Solvent Orange 7	1.0
3383-96-8	Temephos	1.0
3653-48-3	Methoxone sodium salt ((4-Chloro-2-methylphenoxy) acetate sodium salt)	0.1
3761-53-3	C.I. Food Red 5	0.1
4080-31-3	1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	1.0
4170-30-3	Crotonaldehyde	1.0
4549-40-0	N-Nitrosomethylvinylamine	0.1
4680-78-8	C.I. Acid Green 3	1.0
5234-68-4	Carboxin (5,6-Dihydro-2-methyl-N-phenyl-1,4-oxathiin-3-carboxamide)	1.0
5598-13-0	Chlorpyrifos methyl [O,O-Dimethyl-O-(3,5,6-trichloro-2-pyridyl)phosphorothioate]	1.0
5902-51-2	Terbacil [5-Chloro-3-(1,1-dimethylethyl)-6-methyl-2,4(1H,3H)-pyrimidinedione]	1.0
6459-94-5	C.I. Acid Red 114	0.1
7287-19-6	Prometryn [N,N'-Bis(1-methylethyl)-6-methylthio-1,3,5-triazine-2,4-diamine]	1.0
7429-90-5	Aluminum (fume or dust)	1.0
7439-92-1	Lead (when lead is contained in stainless steel, brass or bronze alloys the *de minimis* level is 0.1)	*
7439-96-5	Manganese	1.0
7439-97-6	Mercury	*

CAS Number	Chemical Name	*De Minimis* Limit
7440-02-0	Nickel	0.1
7440-22-4	Silver	1.0
7440-28-0	Thallium	1.0
7440-36-0	Antimony	1.0
7440-38-2	Arsenic	0.1
7440-39-3	Barium	1.0
7440-41-7	Beryllium	0.1
7440-43-9	Cadmium	0.1
7440-47-3	Chromium	1.0
7440-48-4	Cobalt	0.1
7440-50-8	Copper	1.0
7440-62-2	Vanadium (except when contained in an alloy)	1.0
7440-66-6	Zinc (fume or dust)	1.0
7550-45-0	Titanium tetrachloride	1.0
7632-00-0	Sodium nitrite	1.0
7637-07-2	Boron trifluoride	1.0
7647-01-0	Hydrochloric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)	1.0
7664-39-3	Hydrogen fluoride	1.0
7664-41-7	Ammonia (includes anhydrous ammonia and aqueous ammonia from water dissociable ammonium salts and other sources; 10 percent of total aqueous ammonia is reportable under this listing)	1.0
7664-93-9	Sulfuric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)	1.0
7696-12-0	Tetramethrin [2,2-Dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid (1,3,4,5,6,7-hexahydro-1,3-dioxo-2H-isoindol-2-yl)methyl ester]	1.0
7697-37-2	Nitric acid	1.0
7723-14-0	Phosphorus (yellow or white)	1.0
7726-95-6	Bromine	1.0
7758-01-2	Potassium bromate	0.1
7782-41-4	Fluorine	1.0
7782-49-2	Selenium	1.0
7782-50-5	Chlorine	1.0
7786-34-7	Mevinphos	1.0
7803-51-2	Phosphine	1.0
8001-35-2	Toxaphene	*
8001-58-9	Creosote	0.1
9006-42-2	Metiram	1.0
10028-15-6	Ozone	1.0
10034-93-2	Hydrazine sulfate	0.1
10049-04-4	Chlorine dioxide	1.0

CAS Number	Chemical Name	De Minimis Limit
10061-02-6	trans-1,3-Dichloropropene	0.1
10294-34-5	Boron trichloride	1.0
10453-86-8	Resmethrin [[5-(Phenylmethyl)-3-furanyl]methyl-2,2-dimethyl-3-(2-methyl-1-propenyl) cyclopropanecarboxylate]]	1.0
12122-67-7	Zineb [Carbamodithioic acid, 1,2-ethanediylbis-, zinc complex]	1.0
12427-38-2	Maneb [Carbamodithioic acid, 1,2-ethanediylbis-, manganese complex]	1.0
13194-48-4	Ethoprop [Phosphorodithioic acid O-ethyl S,S-dipropyl ester]	1.0
13356-08-6	Fenbutatin oxide (Hexakis(2-methyl-2-phenylpropyl) distannoxane)	1.0
13463-40-6	Iron pentacarbonyl	1.0
13474-88-9	1,1-Dichloro-1,2,2,3,3-pentafluoropropane (HCFC-225cc)	1.0
13684-56-5	Desmedipham	1.0
14484-64-1	Ferbam [Tris(dimethylcarbamodithioato-S,S')iron]	1.0
15972-60-8	Alachlor	1.0
16071-86-6	C.I. Direct Brown 95	0.1
16543-55-8	N-Nitrosonornicotine	0.1
17804-35-2	Benomyl	1.0
19044-88-3	Oryzalin [4-(Dipropylamino)-3,5-dinitrobenzenesulfonamide]	1.0
19666-30-9	Oxydiazon [3-[2,4-Dichloro-5-(1-methylethoxy) phenyl]-5-(1,1-dimethylethyl)-1,3,4-oxadiazol-2(3H)-one]	1.0
20325-40-0	3,3'-Dimethoxybenzidine dihydrochloride (o-Dianisidine dihydrochloride)	0.1
20354-26-1	Methazole [2-(3,4-Dichlorophenyl)-4-methyl-1,2,4-oxadiazolidine-3,5-dione]	1.0
20816-12-0	Osmium tetroxide	1.0
20859-73-8	Aluminum phosphide	1.0
21087-64-9	Metribuzin	1.0
21725-46-2	Cyanazine	1.0
22781-23-3	Bendiocarb [2,2-Dimethyl-1,3-benzodioxol-4-ol methylcarbamate]	1.0
23564-05-8	Thiophanate methyl	1.0
23564-06-9	Thiophanate ethyl [[1,2-Phenylenebis(iminocarbonothioyl)] biscarbamic acid diethyl ester]	1.0
23950-58-5	Pronamide	1.0
25311-71-1	Isofenphos [2-[[Ethoxyl[(1-methylethyl)-amino]phosphinothioyl]oxy]benzoic acid 1-methylethyl ester]	1.0
25321-14-6	Dinitrotoluene (mixed isomers)	1.0
25321-22-6	Dichlorobenzene (mixed isomers)	0.1
25376-45-8	Diaminotoluene (mixed isomers)	0.1
26002-80-2	Phenothrin [2,2-Dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid (3-phenoxyphenyl)methyl ester]	1.0
26471-62-5	Toluene diisocyanate (mixed isomers)	0.1
26628-22-8	Sodium azide	1.0
26644-46-2	Triforine [N,N'-[1,4-Piperazinediylbis (2,2,2-trichloroethylidene)]bisformamide]	1.0
27314-13-2	Norflurazon [4-Chloro-5-(methylamino)-2-[3-(trifluoromethyl)phenyl]-3(2H)-pyridazinone]	1.0
28057-48-9	d-trans-Allethrin [d-trans-Chrysanthemic acid of d-allethrone]	1.0
28249-77-6	Thiobencarb [Carbamic acid, diethylthio-, S-(p-chlorobenzyl)ester]	1.0
28407-37-6	C.I. Direct Blue 218	1.0
29082-74-4	Octachlorostyrene	*
29232-93-7	Pirimiphos methyl [O-(2-(Diethylamino)-6-methyl-4-pyrimidinyl)-O,O-dimethylphosphorothioate]	1.0
30560-19-1	Acephate (Acetylphosphoramidothioic acid O,S-dimethyl ester)	1.0
31218-83-4	Propetamphos [3-[(Ethylamino) methoxyphosphinothioyl]oxy]-2-butenoic acid, 1-methylethyl ester]	1.0
33089-61-1	Amitraz	1.0
34014-18-1	Tebuthiuron [N-[5-(1,1-Dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea]	1.0
34077-87-7	Dichlorotrifluoroethane	1.0
35367-38-5	Diflubenzuron	1.0

Table II

CAS Number	Chemical Name	*De Minimis* Limit
35400-43-2	Sulprofos [O-Ethyl O-[4-(methylthio)phenyl]-phosphorodithioic acid S-propyl ester]	1.0
35554-44-0	Imazalil [1-[2-(2,4-Dichlorophenyl)-2-(2-propenyloxy)ethyl]-1H-imidazole]	1.0
35691-65-7	1-Bromo-1-(bromomethyl)-1,3-propanedicarbonitrile	1.0
38727-55-8	Diethatyl ethyl	1.0
39156-41-7	2,4-Diaminoanisole sulfate	0.1
39300-45-3	Dinocap	1.0
39515-41-8	Fenpropathrin [2,2,3,3-Tetramethylcyclopropane carboxylic acid cyano(3-phenoxyphenyl)methyl ester]	1.0
40487-42-1	Pendimethalin [N-(1-Ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine]	*
41198-08-7	Profenofos [O-(4-Bromo-2-chlorophenyl)-O-ethyl-S-propyl phosphorothioate]	1.0
41766-75-0	3,3'-Dimethylbenzidine dihydrofluoride (o-Tolidinedihydrofluoride)	0.1
42874-03-3	Oxyfluorfen	1.0
43121-43-3	Triadimefon [1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone]	1.0
50471-44-8	Vinclozolin [3-(3,5-Dichlorophenyl)-5-ethenyl-5-methyl-2,4-oxazolidinedione]	1.0
51235-04-2	Hexazinone	1.0
51338-27-3	Diclofop methyl [2-[4-(2,4-Dichlorophenoxy)-phenoxy]propanoic acid, methyl ester]	1.0
51630-58-1	Fenvalerate [4-Chloro-alpha-(1-methylethyl)-benzeneacetic acid cyano(3-phenoxyphenyl)methyl ester]	1.0
52645-53-1	Permethrin [3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropane carboxylic acid, (3-phenoxyphenyl)methyl ester]	1.0
53404-19-6	Bromacil, lithium salt [2,4(1H,3H)-Pyrimidinedione, 5-bromo-6-methyl-3-(1-methylpropyl), lithium salt]	1.0
53404-37-8	2,4-D 2-ethyl-4-methylpentyl ester	0.1
53404-60-7	Dazomet, sodium salt [Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione, ion(1-), sodium]	1.0
55290-64-7	Dimethipin [2,3-Dihydro-5,6-dimethyl-1,4-dithiin 1,1,4,4-tetraoxide]	1.0
55406-53-6	3-Iodo-2-propynyl butyl carbamate	1.0
57213-69-1	Triclopyr triethylammonium salt	1.0
59669-26-0	Thiodicarb	1.0
60168-88-9	Fenarimol [.alpha.-(2-Chlorophenyl)-.alpha.-(4-chlorophenyl)-5-pyrimidinemethanol]	1.0
60207-90-1	Propiconazole [1-[2-(2,4-Dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]-methyl-1H-1,2,4,-triazole]	1.0
62476-59-9	Acifluorfen, sodium salt [5-(2-Chloro-4-(trifluoromethyl)phenoxy)-2-nitrobenzoic acid, sodium salt]	1.0
63938-10-3	Chlorotetrafluoroethane	1.0
64902-72-3	Chlorsulfuron [2-Chloro-N-[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino] carbonyl] benzenesulfonamide]	1.0
64969-34-2	3,3'-Dichlorobenzidine sulfate	0.1
66441-23-4	Fenoxaprop ethyl [2-(4-((6-Chloro-2-benzoxazolylen)oxy)phenoxy)propanoic acid, ethyl ester]	1.0
67485-29-4	Hydramethylnon [Tetrahydro-5,5-dimethyl-2(1H)-pyrimidinone[3-[4-(trifluoromethyl)phenyl]-1-[2-[4-(trifluoromethyl)phenyl]ethenyl]-2-propenylidene]hydrazone]	1.0
68085-85-8	Cyhalothrin [3-(2-Chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylic acid cyano(3-phenoxyphenyl) methyl ester]	1.0
68359-37-5	Cyfluthrin [3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid, cyano(4-fluoro-3-phenoxyphenyl) methyl ester]	1.0
69409-94-5	Fluvalinate [N-[2-Chloro-4-(trifluoromethyl)phenyl]DL-valine(+)-cyano(3-phenoxyphenyl)methyl ester]	1.0
69806-50-4	Fluazifop butyl [2-[4-[[5-(Trifluoromethyl)-2-pyridinyl]oxy]phenoxy]propanoic acid, butyl ester]	1.0
71751-41-2	Abamectin [Avermectin B1]	1.0
72178-02-0	Fomesafen [5-(2-Chloro-4-(trifluoromethyl)phenoxy)-N-methylsulfonyl)-2-nitrobenzamide]	1.0
72490-01-8	Fenoxycarb [[2-(4-Phenoxy phenoxy)ethyl]carbamic acid ethyl ester]	1.0

CAS Number	Chemical Name	*De Minimis* Limit
74051-80-2	Sethoxydim [2-[1-(Ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxyl-2-cyclohexen-1-one]	1.0
76578-14-8	Quizalofop-ethyl [2-[4-[(6-Chloro-2-quinoxalinyl) oxy]phenoxy]propanoic acid ethyl ester]	1.0
77501-63-4	Lactofen [Benzoic acid, 5-[2-Chloro-4-(trifluoromethyl)phenoxy]-2-nitro-, 2-ethoxy-1-methyl-2-oxoethyl ester]	1.0
82657-04-3	Bifenthrin	1.0
88671-89-0	Myclobutanil [.alpha.-Butyl-.alpha.-(4-chlorophenyl)-1H-1,2,4-triazole-1-propanenitrile]	1.0
90454-18-5	Dichloro-1,1,2-trifluoroethane	1.0
90982-32-4	Chlorimuron ethyl [Ethyl-2-[[[[(4-chloro-6-methoxyprimidin-2-yl)amino]carbonyl] amino]sulfonyl]benzoate]	1.0
101200-48-0	Tribenuron methyl [2-[[[[(4-Methoxy-6-methyl-1,3,5-triazin-2-yl)methylamino]carbonyl] amino]sulfonyl]benzoic acid methyl ester]	1.0
111512-56-2	1,1-Dichloro-1,2,3,3,3-pentafluoropropane (HCFC-225eb)	1.0
111984-09-9	3,3'-Dimethoxybenzidine hydrochloride (o-Dianisidine hydrochloride)	0.1
127564-92-5	Dichloropentafluoropropane	1.0
128903-21-9	2,2-Dichloro-1,1,1,3,3-pentafluoropropane (HCFC-225aa)	1.0
136013-79-1	1,3-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225ea)	1.0

c. Chemical Categories

Section 313 requires reporting on the EPCRA Section 313 chemical categories listed below, in addition to the specific EPCRA Section 313 chemicals listed above.

The metal compound categories listed below, unless otherwise specified, are defined as including any unique chemical substance that contains the named metal (e.g., antimony, nickel, etc.) as part of that chemical's structure.

EPCRA Section 313 chemical categories are subject to the 1% *de minimis* concentration unless the substance involved meets the definition of an OSHA carcinogen in which case the 0.1% *de minimis* concentration applies. The *de minimis* concentration for each category is provided in parentheses. The *de minimis* exemption is not available for PBT chemicals, therefore an asterisk appears where a *de minimis* limit would otherwise appear. However, for purposes of the supplier notification requirement only, such limits are provided in Appendix D.

N010 Antimony Compounds (1.0)
Includes any unique chemical substance that contains antimony as part of that chemical's infrastructure.

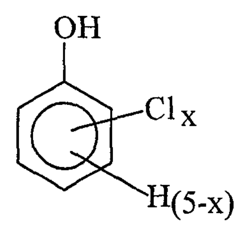
N020 Arsenic Compounds (inorganic compounds: 0.1; organic compounds: 1.0)
Includes any unique chemical substance that contains arsenic as part of that chemical's infrastructure.

N040 Barium Compounds (1.0)
Includes any unique chemical substance that contains barium as part of that chemical's infrastructure. This category does not include: Barium sulfate CAS Number 7727-43-7

N050 Beryllium Compounds (0.1)
Includes any unique chemical substance that contains beryllium as part of that chemical's infrastructure.

N078 Cadmium Compounds (0.1)
Includes any unique chemical substance that contains cadmium as part of that chemical's infrastructure.

N084 Chlorophenols (0.1)



Where x = 1 to 5

N090 Chromium Compounds
(except for chromite ore mined in the Transvaal Region of South Africa and the unreacted ore component of the chromite ore processing residue (COPR). COPR is the solid waste remaining after aqueous extraction of oxidized chromite ore that has been combined with soda ash and kiln roasted at approximately 2,000 deg.F.)
(chromium VI compounds: 0.1; chromium III compounds: 1.0)

Includes any unique chemical substance that contains

N096 Cobalt Compounds (inorganic compounds: 0.1; organic compounds: 1.0)
Includes any unique chemical substance that contains cobalt as part of that chemical's infrastructure.

N100 Copper Compounds (1.0)
Includes any unique chemical substance that contains copper as part of that chemical's infrastructure. This category does not include copper phthalocyanine compounds that are substituted with only hydrogen, and/or chlorine, and/or bromine.

N106 Cyanide Compounds (1.0)
X^+CN^- where $X = H^+$ or any other group where a formal dissociation can be made. For example KCN or $Ca(CN)_2$.

N120 Diisocyanates (1.0)
This category includes only those chemicals listed below.

38661-72-2	1,3-Bis(methylisocyanate) -cyclohexane
10347-54-3	1,4-Bis(methylisocyanate)-cyclohexane
2556-36-7	1,4-Cyclohexane diisocyanate
134190-37-7	Diethyldiisocyanatobenzene
4128-73-8	4,4'-Diisocyanatodiphenyl ether
75790-87-3	2,4'-Diisocyanatodiphenyl sulfide
91-93-0	3,3'-Dimethoxybenzidine-4,4'-diisocyanate
91-97-4	3,3'-Dimethyl-4,4'-diphenylene diisocyanate
139-25-3	3,3'-Dimethyldiphenyl methane-4,4'-diisocyanate
822-06-0	Hexamethylene-1,6-diisocyanate
4098-71-9	Isophorone diisocyanate
75790-84-0	4-Methyldiphenylmethane-3,4-diisocyanate
5124-30-1	1,1-Methylenebis(4-isocyanatocyclohexane)
101-68-8	Methylenebis(phenylisocyanate) (MDI)
3173-72-6	1,5-Naphthalene diisocyanate
123-61-5	1,3-Phenylene diisocyanate
104-49-4	1,4-Phenylene diisocyanate
9016-87-9	Polymeric diphenylmethane diisocyanate
16938-22-0	2,2,4-Trimethylhexamethylene diisocyanate
15646-96-5	2,4,4-Trimethylhexamethylene

chromium as part of that chemical's infrastructure.

diisocyanate

N150 Dioxin and Dioxin-Like Compounds (Manufacturing; and the processing or otherwise use of dioxin and dioxin-like compounds if the dioxin and dioxin-like compounds are present as contaminants in a chemical and if they were created during the manufacturing of that chemical.) (*) This category includes only those chemicals listed below. [Note: When completing the Form R, Part II, Section 1.4, enter the distribution percent estimates for each of the dioxin and dioxin-like compounds chemical category members in the order they are listed here (i.e., 1-17).]

1	67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran
2	55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran
3	70648-26-9	1,2,3,4,7,8-Hexachlorod-benzofuran
4	57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran
5	72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran
6	60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran
7	39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin
8	57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-*p*-dioxin
9	19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin
10	35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin
11	39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran
12	3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-*p*-dioxin
13	57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran
14	57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran
15	40321-76-4	1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin
16	51207-31-9	2,3,7,8-Tetrachlorodibenzofuran
17	1746-01-6	2,3,7,8-Tetrachlorodibenzo-*p*-dioxin

N171 Ethylenebisdithiocarbamic acid, salts and esters EBDCs) (1.0)
Includes any unique chemical substance that contains an EBDC or an EBDC salt as part of that chemical's infrastructure.

N230 Certain Glycol Ethers (1.0)

$R\text{-}(OCH_2CH_2)_n\text{-}OR'$
where n = 1, 2, or 3
R = alkyl C7 or less; or
R = phenyl or alkyl substituted phenyl;
R' = H, or alkyl C7 or less; or
OR' consisting of carboxylic acid ester, sulfate, phosphate, nitrate, or sulfonate.

N420 Lead Compounds (*)
Includes any unique chemical substance that contains lead as part of that chemical's infrastructure.

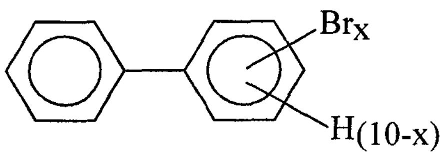
N450 Manganese Compounds (1.0)
Includes any unique chemical substance that contains manganese as part of that chemical's infrastructure.

N458 Mercury Compounds (*)
Includes any unique chemical substance that contains mercury as part of that chemical's infrastructure.

N495 Nickel Compounds (0.1)
Includes any unique chemical substance that contains nickel as part of that chemical's infrastructure.

N503 Nicotine and salts (1.0)
Includes any unique chemical substance that contains nicotine or a nicotine salt as part of that chemical's infrastructure.

N511 Nitrate compounds (water dissociable; reportable only when in aqueous solution) (1.0)



N575 Polybrominated Biphenyls (PBBs) (0.1)

Where x = 1 to 10

N583 Polychlorinated alkanes (C_{10} to C_{13}) (1.0, except for those members of the category that have an average chain length of 12 carbons and contain an average chlorine content of 60% by weight which are subject to the 0.1% *de minimis*)

$C_xH_{2x+2-y}Cl_y$
where x = 10 to 13;
y = 3 to 12; and
the average chlorine content ranges from 40 – 70% with the limiting molecular formulas $C_{10}H_{19}Cl_3$ and $C_{13}H_{16}Cl_{12}$

N590 Polycyclic aromatic compounds (PACs) (*)
This category includes the chemicals listed below.

56-55-3	Benzo(a)anthracene
205-99-2	Benzo(b)fluoranthene
205-82-3	Benzo(j)fluoranthene
207-08-9	Benzo(k)fluoranthene
206-44-0	Benzo(j,k)fluorene
189-55-9	Benzo(r,s,t)pentaphene
218-01-9	Benzo(a)phenanthrene
50-32-8	Benzo(a)pyrene
226-36-8	Dibenz(a,h)acridine
224-42-0	Dibenz(a,j)acridine
53-70-3	Dibenzo(a,h)anthracene
194-59-2	7H-Dibenzo(c,g)carbazole
5385-75-1	Dibenzo(a,e)fluoranthene
192-65-4	Dibenzo(a,e)pyrene
189-64-0	Dibenzo(a,h)pyrene
191-30-0	Dibenzo(a,l)pyrene
57-97-6	7,12-Dimethylbenz(a)-anthracene
193-39-5	Indeno(1,2,3-cd)pyrene
56-49-5	3-Methylcholanthrene
3697-24-3	5-Methylchrysene
5522-43-0	1-Nitropyrene

N725 Selenium Compounds (1.0)
Includes any unique chemical substance that contains selenium as part of that chemical's infrastructure.

N740 Silver Compounds (1.0)
Includes any unique chemical substance that contains silver as part of that chemical's infrastructure.

N746 Strychnine and salts (1.0)
Includes any unique chemical substance that contains strychnine or a strychnine salt as part of that chemical's infrastructure.

N760 Thallium Compounds (1.0)
Includes any unique chemical substance that contains thallium as part of that chemical's infrastructure.

N770 Vanadium Compounds (1.0)
Includes any unique chemical substance that contains vanadium as part of that chemical's infrastructure.

N874 Warfarin and salts (1.0)
Includes any unique chemical substance that contains warfarin or a warfarin salt as part of that chemical's infrastructure.

N982 Zinc Compounds (1.0)
Includes any unique chemical substance that contains zinc as part of that chemical's infrastructure.

CES Environmental Services, Inc.

Name of Waste: Non-Hazardous alcohol exemption wastewater
Profile: 01110901071BH

Attached List: Waste Water Chemical Composition

Water : 68 – 100 %
Mixed Alcohols: 1-22 %
Solids: 0-2% (dirt, grit, rust, filter media, road grime)
Dissolved Salts: 0-5 %
Oils (0-1%)
Oil Additives (0-1%)
Sulfide: 0-10 ppm
Cyanide: 0-5 ppm

Concentration range for the constituents listed below: 0-2%

ACIDS
ALKANES
ALKENES
ALKYNES
AMINES
AMIDES
AMMONIA
AMMONIA COMPOUNDS
ALDEHYDES
ARYL COMPOUNDS
AROMATICS
BASES
CAUSTICS
CHLORINATED COMPOUNDS
CYCLIC COMPOUNDS
DYES
EPOXIDES
ESTERS
ETHERS
FATTY ACIDS
GLYCOLS
HALOGEN COMPOUNDS
IMIDES
IMINES
INKS
KETONES
LACHRYMATORS
MERCAPTANS
METALS
MINERALS
NITRILES
OLEFINS
PARRAFINS
PETROLEUM SOLVENTS
POLYMERS
PESTICIDES (non-hazardous)
PEROXIDES
PHOSPHATES
PLASTICS
PETROLEUM DERIVIATIVES
RESINS
SUGARS
SULFATES
SULFUR COMPOUNDS
SURFACTANTS
SOAPS
THIO COMPOUNDS
WAXES

CES Environmental Services, Inc.

Name of Waste: Class 1, Non-hazardous Rinse Water
Profile: 0808081014BH

Attached List: Waste Water Chemical Composition

Water : 90 – 100 %
Solids: 0-2% (dirt, grit, rust, filter media, road grime)
Dissolved Salts: 0-5 %
Oils (0-1%)
Oil Additives (0-1%)
Sulfide: 0-10 ppm
Cyanide: 0-5 ppm

List of Remaining constituents: 0-2 %

ACIDS
ALCOHOLS
ALKANES
ALKENES
ALKYNES
AMINES
AMIDES
AMMONIA
AMMONIA COMPOUNDS
ALDEHYDES
ARYL COMPOUNDS
AROMATICS
BASES
CAUSTICS
CHLORINATED COMPOUNDS
CYCLIC COMPOUNDS
DYES
EPOXIDES
ESTERS
ETHERS
FATTY ACIDS
GLYCOLS
HALOGEN COMPOUNDS
IMIDES
IMINES
INKS
KETONES
LACHRYMATORS
MERCAPTANS
METALS
MINERALS
NITRILES
OLEFINS
PARRAFINS
PETROLEUM SOLVENTS
POLYMERS
PESTICIDES (non-hazardous)
PEROXIDES
PHOSPHATES
PLASTICS
PETROLEUM DERIVIATIVES
RESINS
SUGARS
SULFATES
SULFUR COMPOUNDS
SURFACTANTS
SOAPS
THIO COMPOUNDS
WAXES

NEWPARK:

Alcohol Exemption Wastewater:

Profile # 0111091071BH

NES TX/NID

NONHAZARDOUS SOLID WASTE DISPOSAL APPLICATION

1. GENERATOR CERTIFICATION

I hereby certify that I am the legal generator of the waste described below. The waste description on this form and all attachments are, to the best of my knowledge and ability, representative, complete, and accurate. This waste is not a regulated hazardous waste by USEPA, State of Origin, or State of Disposal, nor does it contain PCB's regulated by TSCA (ie., 40 CFR 761) or any local authority.

GENERATOR'S SIGNATURE/GENERATOR'S AUTHORIZED SIGNATORY:

Date: 11-Jan-08 Signature: [signature]

Printed/Typed Name, Title, Employer: Prabhakar R. Thangudu, HSE Manager, CES Environmental Services, Inc.

2. GENERATOR INFORMATION

a. Generator's Name: CES Environmental Services, Inc
b. Generator's Address: 4904 Griggs Road
City: Houston State: TX Zip: 77021
Telephone: (713) 676-1460
Fax: (713) 676-1676
c. Generator Representative: Prabhakar R. Thangudu
Title: HSE Manager
Telephone: (713) 676-1460
Fax: (713) 676-1676

d. Billing Name: CES Environmental Services, Inc.
e. Billing Address: 4904 Griggs Road
City: Houston State: TX Zip: 77021
f. Contact Person: Prabhakar R. Thangudu
g. Telephone: 713-676-1460
Fax: (713) 676-1676
Email: pthangudu@cesenvironmental.com

3. WASTE DESCRIPTION

a. Waste Name/Waste Description: Non-Hazardous alcohol exemption wastewater (alcohol total volume will not exceed 23% and will include IPA, Methanol, Butanol, Ethanol, and other small chanin alcohols)

b. Process of Waste Generation: Wastewater generated from the consolidation of various wastewaters that meet the exemption for low flash materials containing only alcohols (40 CFR 261.21(a)(1)

c. TCEQ Waste Code # (If Applicable): 90261191

d. Origin of Waste:

( ) Oil and Gas Facility
Field Name/#:
Lease Name/#
Well Name/#:
Rig Name/#:
Parish/County:
State:

(X) Industrial Facility
Facility Name: CES Env. Services, Inc.
Address: 4904 Griggs Road
City: Houston
Parish/County Harris
State: TX
Facility State Id 30900

e. Physical State: ( ) Solid ( ) Semi-Solid (X) Liquid ( ) Powder (x) Combination

f. Color Clear to brown Odor Strong ammonia Odor PPE Level (A-K,X) D

g. Anticipated Waste Volume: 20 K ( ) Tons ( ) CuYds (X) Gals ( ) CuMtrs ( ) BBls

Frequency: ( ) Year (X) Month ( ) Week ( ) Day ( ) One Time ( ) Other

h. Specify Method of Shipment: Bulk Tank Trailer

4. WASTE COMPOSITION & CONSTITUENTS

Physical Components	Concentration Range	Units	Amendments (Newpark Only)
Oil and Grease:	0-1	%	
Water:	98-100	%	
Solids:	0-2	%	
Foreign Debris:			
Other (List Below):			
	0	%	
	0	%	
pH:	2.1-12.4	std units	
Specific Gravity:	~1		
NORM-Ra 226:	<30	pCi/gm	
Total Activity:	<150	pCi/gm	

revised 4/21/06

Replaces 827BH

EPAHO113001257

Profile # 080808/1014 BH

NES TX/NID

NONHAZARDOUS SOLID WASTE DISPOSAL APPLICATION

1. GENERATOR CERTIFICATION

I hereby certify that I am the legal generator of the waste described below. The waste description on this form and all attachments are, to the best of my knowledge and ability, representative, complete, and accurate. This waste is not a regulated hazardous waste by USEPA, State of Origin, or State of Disposal, nor does it contain PCB's regulated by TSCA (ie., 40 CFR 761) or any local authority.

GENERATOR'S SIGNATURE/GENERATOR'S AUTHORIZED SIGNATORY:

Date: 6-Aug-07 Signature: Prabhakar Thangudu

Printed/Typed Name, Title, Employer: Prabhakar R. Thangudu, HSE Manager, CES Environmental Services, Inc.

2. GENERATOR INFORMATION

a. Generator's Name: CES Environmental Services, Inc.
b. Generator's Address: 4904 Griggs Road
City: Houston State: TX Zip: 77021
Telephone: (713) 676-1460
Fax: (713) 676-1676
c. Generator Representative: Ryan Thomas
Title: VP
Telephone: (713) 676-1460
Fax: (713) 676-1676

d. Billing Name: CES Environmental Services, Inc.
e. Billing Address: 4904 Griggs Road
City: Houston State: TX Zip: 77021
f. Contact Person: Ryan Thomas
g. Telephone: 713-676-1460
Fax: (713) 676-1676
Email: rthomas@cesenvironmental.com

3. WASTE DESCRIPTION

a. Waste Name/Waste Description: Class 1, Non-hazardous Rinsewater

b. Process of Waste Generation: Consolidation of various non-hazardous wastewaters that have been profiled/classified and QA/QC as per attached waste analysis plan

c. TCEQ Waste Code # (If Applicable): 90241191

d. Origin of Waste:

( ) Oil and Gas Facility
Field Name/#:
Lease Name/#
Well Name/#:
Rig Name/#:
Parish/County:
State:

(X) Industrial Facility
Facility Name: CES Environmental Services,
Address: 4904 Griggs Road
City: Houston
Parish/County Harris
State: TX
Facility State Id 30900

e. Physical State: ( ) Solid ( ) Semi-Solid (X) Liquid ( ) Powder ( ) Combination

f. Color Clear to brown / mild sweet odor Odor Organic PPE Level (A-K,X) D

g. Anticipated Waste Volume: 5,000 ( ) Tons ( ) CuYds (X) Gals ( ) CuMtrs ( ) BBls

Frequency: ( ) Year (x) Month ( ) Week ( ) Day ( ) One Time ( ) Other

h. Specify Method of Shipment: Bulk Tank Trailer

4. WASTE COMPOSITION & CONSTITUENTS

Physical Components	Concentration Range	Units	Amendments (Newpark Only)
Oil and Grease:	<2	%	
Water:	95-98	%	
Solids:	<35	%	
Foreign Debris:			
Other (List Below):			
Glycols	0-50	%	
pH:	3-11	std units	
Specific Gravity:	~1		
NORM-Ra 226:	<30	pCi/gm	
Total Activity:	<150	pCi/gm	

revised 4/21/06

Replaces Profile 796 BH

EPAHO113001258

4-5-2008

Important Hazardous Waste Profiling Information needed from a generator along with Examples of Basic waste information, Physical Characteristics, Chemical Composition information which includes indicating a component that is on the TRI list.

Benzene NESHAP waste indication, HON waste water stream indication, Hazardous and Universa Waste Code information listing, TRI indication.

II. WASTE INFORMATION – PLEASE USE FULL NAMES RATHER THAN ACRONYMS

A. NAME OF WASTE STREAM: ____________

B. DESCRIBE THE PROCESS GENERATING THE WASTE: ____________

C. VOLUME: ________ D. FREQUENCY: ________ E. SAMPLE SOURCE: ________ F. WASTE CONTAINER (TRUCK,DRUM, ETC.): ________

III. PHYSICAL CHARACTERISTICS OF WASTE STREAM

A. FLASH POINT: ________ °F B. pH: ________ C. DENSITY (#/GAL OR S.G.): ________

D. COLOR/APPEARANCE: ________ E. SOLIDS (%): ________ F. ODOR: ________

G. PHYSICAL STATE: ________ H. PHASES/LAYERS: ☐ SINGLE ☐ MULTIPLE I. BTU VALUE: ________

IV. CHEMICAL COMPOSITION-CONSTITUENTS • DO NOT USE GENERIC TERMS (e.g. ORGANICS, SALT, SOLIDS, OILS) • ATTACH MSDS FOR PRODUCTS

________	________	ppm or %	________	________	ppm or %
________	________	ppm or %	________	________	ppm or %
________	________	ppm or %	________	________	ppm or %
________	________	ppm or %	________	________	ppm or %

NO ACRONYMS – PLEASE USE FULL CHEMICAL NAME *(Indicates TRI Listed Chemical) Total ________ % (Must be ≥ 100%)

V. WASTE CONTENT • PLEASE INDICATE IF THE WASTE CONTAINS ANY OF THE FOLLOWING: (ATTACH ANALYTICAL WHERE APPLICABLE)

SULFIDE ________ ppm ☐ YES ☐ NO

CYANIDE ________ ppm ☐ YES ☐ NO

BENZENE ________ ppm ☐ YES ☐ NO

PESTICIDE/HERBICIDE ? ☐ YES ☐ NO

EXPLOSIVE MATERIAL ? ☐ YES ☐ NO

RADIOACTIVE ? ☐ YES ☐ NO

PCB'S >50 ppm ? ☐ YES ☐ NO

PCB TSCA WASTE? ☐ YES ☐ NO

DIOXINS ? ☐ YES ☐ NO

BENZENE NESHAP WASTE ? {40 CFR 61 SUBPART FF} ☐ YES ☐ NO

VOC LESS THAN 500 ppmw? {40 CFR 264 SUBPART CC} ☐ YES ☐ NO

HON WASTEWATER STREAM? {40 CFR 63 SUBPART G} ☐ YES ☐ NO

VI. RCRA CHARACTERIZATION

A. THIS MATERIAL IS A ☐ WASTEWATER (<1% TOC AND <1% TSS) ☐ NONWASTEWATER (>= 1% TOC OR >= 1% TSS)

B. IS THIS A USEPA HAZARDOUS WASTE (40 CFR PART 261)? ☐ YES ☐ NO State of Texas UNIVERSAL WASTE (30 TAC 335.261)? ☐ YES ☐ NO

C. IF EITHER IN B IS YES, ALL APPLICABLE EPA WASTE CODE NUMBERS **MUST** BE LISTED HERE (D, F, K. P, U): ________

SOP

LAB
T-32
8/14/09
ce

Standard Operating Procedure

THINK... USE GOOD JUDGMENT	CES Environmental Services, Inc.	YOUR ATTITUDE COUNTS
Date Issued: 12/31/2008	DEPARTMENT(S): -Operations -Processing -Tank Wash -Transportation -Maintenance and Field Services -Sales, Finance, and Administration	Revised Date: 00/00/0000
SOP Number: 08-043	SOP Title: Purchase Order Request Form	SOP Description: Defines the procedures for Creating and Entering Purchase Order Request Forms into the System.

This Standard Operating Procedure (SOP) outlines the Purchase Order (PO) Request Form procedures from Beginning to End.

1 Purpose

The Purchase Order (PO) Request Form will be completely filled out and submitted when any item(s), hardware(s), etc. needs to be bought and/or services are needed and/or **Vendors** need to get paid to continue Operations at the **CES Environmental Services, Inc.** Facility. If the item(s), hardware(s), etc. and/or services needed and/or **Vendors** will be paid by Cash, Check or Credit Card a Purchase Order (PO) Request Form will be completely filled out and submitted. The Purchase Order (PO) Request Form can be found on the **Shared Drive** within the **Forms and Logos Folder**.

Purchase Order (PO) Request Forms do not need to be filled out for: Insurance, all Utilities, all Loan Payments, Facility Lease or Loan Payments, Barge and Railcar Rentals, Capital and/or Operating Leases and/or Payments to Financial Institutions and other Creditors, Disposal Sites associated with **Customer** Job Expenses sent directly to a Third Party Disposal Facility.

Note: Wastes derived from Internal Processing at **CES Environmental Services, Inc.** and sent to an Off Site Disposal Facility will require a Purchase Order (PO) Request Form to be completely filled out and submitted.

2 Initiation of the Purchase Order (PO) Request Form

When a **CES Environmental Services, Inc. Employee** needs to purchase any item(s), hardware(s), etc. and/or services are needed and/or **Vendors** need to get paid to continue Operations, the **CES Environmental Services, Inc. Employee** will completely and with detail fill out a Purchase Order (PO) Request Form.

If a Purchase Order (PO) Request Form is a request for a **Customer's** Job or multiple **Customers'** Jobs, you must get an Individual Purchase Order (PO) Request Form per **Vendor** per **Customer** per Job. Additionally, no **Customer's** Job Expenditure requests may be mixed on the same Purchase Order (PO) Request Form as those requested for **CES Environmental Services, Inc.** Internal Expenses.

After the Purchase Order (PO) Request Form is completely filled out and signed by the **CES Environmental Services, Inc. Employee** (in the Signatory Area Designated "Submitting Employee"), the **CES Environmental Services, Inc. Employee** should then do the following:

a. For Internal Expense Requests, the submitting **CES Environmental Services, Inc. Employee** will take the completely filled out Purchase Order (PO) Request Form to the appropriate Departmental **Upper or Mid Level Manager** requiring the Expenditure. This **Upper or Mid Level Manager** must then approve the Expense. In order to approve the Expense, the **Upper or Mid Level Manager** must first ensure that the Expense is needed and required by their Operation.

   Second, the **Upper or Mid Level Manager** should determine and note (on the Purchase Order (PO) Request Form) both the Class Code and the specific Account Code to which the Expense should be allocated and how this will affect the Budget for this Account Code. Once this has been determined, the **Upper or Mid Level Manager** must validate that they have not exceeded their Overall Department Budget Currently (by Class Code) and will not exceed the Budget for the Entire Current Month (reference the Standard Operating Procedure (SOP)). Once all this has been verified, the **Upper or Mid Level Manager** should then sign the Purchase Order (PO) Request Form in the Signatory Area Designated "Required By." **Upper or Mid Level Managers** are not allowed to over-spend their Budget without permission from the **President**, the **Vice President of Accounting, Finance, Sales, and Administration** or the **Vice President of Operations and Maintenance**. If an Expense currently exceeds allocated Department Budget (or will cause Monthly Budgetary over-runs later in the Month), the **Upper or Mid Level Manager** must get approval from One of the Three Aforementioned Executives (they are to sign in the Signatory Area on the Purchase Order (PO) Request Form designated "Executive Approval"). Also, Expenses exceeding $10,000.00 must be approved by One of the Three Aforementioned Executives.

For **Customer** Job Expenses, the submitting **CES Environmental Services, Inc. Employee** must get the signature of the appropriate **Customer Service and Inside Sales Representative**. Before approval, the **Customer Service and Inside Sales Representative** must review the Job Folder and/or contact the appropriate **Sales Representative** to ensure that the **Customer** will be charged for the Expensed Item. This must be documented on the P&L Sheet in the **Customer** Job Folder. The **Customer Service and Inside Sales Representative** will now sign the Purchase Order (PO) Request Form in the Signatory Area designated "Required By." The **Customer Service and Inside Sales Representative** will make a Copy of the Purchase Order (PO) Request Form and File it in the appropriate **Customer** Job Folder (this must be done the same Day).

Note: This will include Purchase Order (PO) Request Forms obtained for Disposal of Wastes received at **CES Environmental Services, Inc.** and redirected to a Third Party Disposal Site. In such cases, the requesting **Employee** must make the request and designate the specific **Customer** and **Customer Job Folder**.

b. Next, the submitting **CES Environmental Services, Inc. Employee** will take the Purchase Order (PO) Request Form to the **Administrative Assistants-Accounts Payable Representative** and the following Steps should be performed:

   1. The **Administrative Assistants-Accounts Payable Representative** will review and ensure the For Office Use Only Section of the Purchase Order (PO) Request Form is accurate and complete (paying special attention to the designation of proper Class Codes and Chart of Accounts in **QuickBooks**.

      For Internal Expenses, the **Administrative Assistants-Accounts Payable Representative** will also check the remaining Budget (by exact Class Code) against the requested Expense on the Budget Tab of the Current **UBET File** located on the **Shared Drive** within the **Budgets Folder** (reference Standard Operating Procedure (SOP)). If the Expense exceeds the Budget, Executive Approval is required or the Purchase Order (PO) Request Form will not be approved and a Purchase Order Number will not be assigned.

   2. The appropriate Purchase Order (PO) Request Form Information is Entered into the **Purchase Order Log Book** located on the Top of the **Paid Bills Cabinet** behind the **Administrative Assistants-Accounts Payable Representative's** Desk 1 and the **Administrative Assistants-Accounts Payable Representative's** Desk 2. The **Administrative Assistants-**

Accounts Payable Representative will write the Purchase Order Number from the **Purchase Order Log Book** onto the Purchase Order (PO) Request Form by the PO Number Blank.

3. The Original Purchase Order (PO) Request Form is placed behind the Current Open Purchase Order (PO) Request Forms in the **Purchase Order Log Book** located on the Top of the **Paid Bills Cabinet** behind the **Administrative Assistants-Accounts Payable Representative's** Desk 1 and the **Administrative Assistants-Accounts Payable Representative's** Desk 2.

   Note: The **CES Environmental Services, Inc. Employee** will keep a Copy of the Purchase Order (PO) Request Form.

4. The **Administrative Assistants-Accounts Payable Representative** will Next Log the Purchase Order (PO) Request Form into the Tracking Tab of the Current **UBET File** located on the **Shared Drive** within the **Budgets Folder**. This Spreadsheet keeps a Monthly running Total of Expenses by both Class Code and Account Code and can be reviewed by the **Upper Level Managers** throughout the Month to Track and Control Expenses.

3 Receipt of Goods and Services Requested

When the Delivery occurs, the submitting **CES Environmental Services, Inc. Employee** should be contacted. When the submitting **CES Environmental Services, Inc. Employee** takes Delivery and Receives the Packing Slip, Bill, Delivery Ticket, and/or Bill of Lading (collectively "Delivery Documentation") for the item(s), hardware(s), etc. and/or services received, the **CES Environmental Services, Inc. Employee** will first validate the Delivery Documentation both against the actual items currently received and the Original Request made on the Purchase Order (PO) Request Form. Any discrepancies must immediately be rectified with the **Vendor**. Any Manuals received for Equipment will be properly Managed (reference the Standard Operating Procedure (SOP)).

Next, the submitting **CES Environmental Services, Inc. Employee** will Staple together all associated Delivery Documentation and deliver them to the **Accounts Payable/Accounts Receivable Office**. This Documentation must be placed in the **Delivery Documentation Inbox**.

a. When the **Administrative Assistants-Accounts Payable Representative** receives Delivery Documentation, the **Administrative Assistants-Accounts Payable Representative** will pull the Purchase Order (PO) Request Form from the **Purchase Order Log Book** to verify that what is listed on the Purchase Order (PO) Request Form correlates with what is listed on the Delivery Documentation. Any discrepancies discovered must be rectified immediately with both the submitting **CES Environmental Services, Inc. Employee** and the **Vendor**. Next, the **Administrative Assistants-Accounts Payable Representative** will Staple the Purchase Order (PO) Request Form to the Delivery Documentation and check off all items have been received and/or work has been completed. The Delivery Documentation bundle will Next be Filed Alphabetically (by **Vendor**) in the **Received Goods/Services Pending Cart** located in the **Accounts Payable/Accounts Receivable Office**.

Note: If any item(s), hardware(s), etc. and/or services have not been received (i.e. a Partial Delivery has been made) the **Administrative Assistants-Accounts Payable Representative** will Document and Highlight on the Purchase Order (PO) Request Form what has been received and/or work that has been completed and what remains un-received.

b. For Expenses pertaining to **CES Environmental Services, Inc.** Internal Work, when the **Administrative Assistants-Accounts Payable Representative** Receives a Bill (either via Mail or Email), the **Administrative Assistants-Accounts Payable Representative** will pull the Purchase Order (PO) Request Form and associated Delivery Documentation from either the **Purchase Order Log Book** (in cases where Delivery Documentation was not expected/required) or the **Received Goods/Services Pending Cart** (in cases where Delivery Documentation was applicable). The **Administrative Assistants-Accounts Payable Representative** will then Staple the Bill to the Front of the Delivery Documentation and Purchase Order (PO) Request Form and Enter the Bill into **QuickBooks** while paying special attention to proper Class Code and Account Code allocation. The Bill will be Initially Dated with Current Date in **QuickBooks**. The **Administrative Assistants-Accounts Payable Representative** will Next Enter the Bill into the "Actual" Column of the Tracking Tab in the Current Monthly **UBET File** located on the **Shared Drive** within the **Budgets Folder**. All Original Bills and their corresponding Delivery Documentation and Purchase Order Request Forms (hereinafter referred to simply as "Bills") will be used Daily for Reconciliation Activities.

For Expenses pertaining to **Customer** Jobs, when the **Administrative Assistants-Accounts Payable Representative** Receives a Bill (either via Mail or Email) pertaining to a **Customer** Job Cost, the Original Bill will be given to the appropriate **Administrative Assistants-Accounts Receivable Representative**. When the **Customer** is ready to be Billed for the Job, the **Administrative Assistants-Accounts Receivable Representative** will put an Orange Check Mark on the Original Bill and make a Copy (to be placed in the **Customer Job Folder**). The **Administrative Assistants-Accounts Receivable Representative** will Enter the Bill into **QuickBooks** paying special attention to proper Class Code and Account Code allocation. The Bill will be Initially Dated with Current Date in **QuickBooks**. All Original Bills and their corresponding Delivery Documentation and Purchase Order Request

Forms (hereinafter referred to simply as "Bills") will be given to the **Administrative Assistants-Accounts Payable Representative** for Daily Reconciliation.

Note: All Third Party Disposal Revenues and Expenses will have a Class Code of **DRM** (this includes Redirected Loads).

4 Daily Reconciliation

a. On the Day Bills are Entered into **QuickBooks**, the **Administrative Assistants-Accounts Payable Representative** will place the Bill in the **Daily Reconciliation Folder** located on the **Administrative Assistants-Accounts Payable Representative's** Desk 1 and the **Administrative Assistants-Accounts Payable Representative's** Desk 2. At the End of each Day, the **Administrative Assistants-Accounts Payable Representatives** will place the **Daily Reconciliation Folders** on the **Office Supervisor's** Desk for Daily Reconciliation Activities (reference the Standard Operating Procedure (SOP)).

   Note: Any adjustments or credits for the Day are placed in the **Color Folder** located inside the **Daily Reconciliation Folders**. Also, the **Administrative Assistants-Accounts Payable Representative** should not Enter Bills with an Orange Check Mark into **QuickBooks** as they have been pre-entered by the **Administrative Assistants-Accounts Receivable Representative.**

b. After the Daily Reconciliation of the **CES Environmental Services, Inc. QuickBooks** versus the **Black Book** (reference the Standard Operating Procedure (SOP)), the **Office Supervisor** will give the **Daily Reconciliation Folders** back to the **Administrative Assistants-Accounts Payable Representative** the following Morning. The **Administrative Assistants-Accounts Payable Representative** will change the Bill Date in **QuickBooks** to the Date when the Bill was received.

   Note: If the Bill was received within the Current Month, then put the Date the Bill was received. If the Bill was received for the Previous Month, then put the Date for the Bill as the First Day of the Current Month.

c. Everything in the **Daily Reconciliation Folders** is then Filed away in the **Pending for Payment Folder** located on the Right Hand Side of the **Administrative Assistants-Accounts Payable Representative's** Desk 1. The Bills will remain here until Payment is issued. Once the Payment has been made on previously Entered Bills, they will be Filed Alphabetically by **Vendor** with the most Current Bills in front within the **Paid Bills Cabinet** located behind the **Administrative Assistants-Accounts Payable Representative's** Desk 1 and the **Administrative Assistants-Accounts Payable Representative's** Desk 2.

5 Archiving

a. The **Paid Bills Cabinets** are archived Yearly, but kept in the **Accounts Payable/Accounts Receivable Office** at least Six Months before being placed in the **Archived Room** within the **Training Center**.

b. The **CES Customer Files Cabinets** are archived when needed and placed in the **Archived Room** within the **Training Center**.

c. The **Tank Wash Customer Files Cabinets** are archived when needed and placed in the **Archived Room** within the **Training Center**.

Purchase Order Request Form

PO Number: ____________________
Date: __________________________

Vendor: ______________________________

Contact: ______________________________

Phone: ______________________________

Item #	Description	Quantity	Cost
___	_______________________________	_________	______
___	_______________________________	_________	______
___	_______________________________	_________	______
___	_______________________________	_________	______
___	_______________________________	_________	______
___	_______________________________	_________	______
___	_______________________________	_________	______
		Total:	______

Submitting Employee: ________________________________

Required By: ____

Administrative Validation: ______________________________

Executive Approval: ___________________________________
(Only Required if Monthly Expenses Exceed Budget or for any Internal Expenses Greater than $10,000.)

For Office Use Only

Class Codes:

_____ TW
_____ FS
_____ Trans
_____ SGA
_____ MRI
_____ DRM
_____ DSP
_____ REC

Chart of Account #: ____________________

Job Expense: Yes or No

What Job?____________________________

___ Give Vendor Re-Sale Certificate

___ Vendor to Charge Sales Tax

Note: This Form can be found on the Shared Drive under the Forms and Logos Folder.

Standard Operating Procedure

THINK... USE GOOD JUDGMENT	CES Environmental Services, Inc.	YOUR ATTITUDE COUNTS
Date Issued: 09/27/2006	DEPARTMENT(S): -Operations -Processing -Maintenance and Field Services -Sales, Finance, and Administration	Revised Date: 10/22/2008
Policy Number: 06-001	SOP Title: Flow of Essential Operating Paperwork (Non-Tank Wash)	SOP Description: Defines Flow of Essential Operating Paperwork such as Trip Tickets, Manifests, Bills Of Lading, etc. from Origination to the beginning of the Billing Cycle (excludes Tank Wash).

1) Creation of Essential Operating Paperwork:

Essential Operating Paperwork (excluding **Tank Wash** Operating Paperwork) is initially created by **Customer Service and Inside Sales Representatives** and **Logistics Supervisors**. The only exceptions are **Tank Wash** Operating Paperwork and Jobs where **Customers** arrive without notice for Routine Jobs.

Essential Operating Paperwork is collectively Items such as:

- Uniform Hazardous Waste Manifests
- Job Information Profiles
- Transportation Work Tickets
- Bills Of Lading for Products Sold
- Bills Of Lading for Products Purchased
- Weight Tickets
- Non-Bulk Container Labels
- Roll-Off or Tote Container-Level 1 Inspection Forms
- Out of State Mileage Logs
- Trailer Inspection Forms
- Driver's Vehicle Inspection Reports
- Driver's Daily Logs
- Inbound Wastewater Load Reports

- Outbound Wastewater Tank Reports
- Outbound Load Reports
- Inbound Load Reports

2) Origination and Routing Essential Operating Paperwork:

After initial Essential Operating Paperwork is printed, the **Logistics Supervisors** will then package the Paperwork and put the Bundled Paperwork in the Inbox Titled Driver Job Boxes. The Bundled Paperwork will be in Individual Packets with each **Driver's** Name on the front in Bold Letters.

Drivers shall pick-up their Essential Operating Paperwork from the Driver Job Boxes. All Essential Operating Paperwork in **Driver's** Packets must be fully completed.

Note: For any Loads leaving **CES Environmental Services, Inc.** that require a Signature from the **Main Processing Laboratory Personnel**, the **Logistics Supervisors** will place the Essential Operating Paperwork in a separate **Driver's** Packet and take it to the **Main Processing Facility Laboratory** the night before. These **Driver's** Packets will be placed in the Subcontracted Drivers Inbox on the wall just inside the **Main Processing Facility Laboratory**.

Jobs concerning **CES Environmental Services, Inc.** Products sold to Buyers (not transported by **CES Environmental Services, Inc.**), **CES Environmental Services, Inc.** Wastes (not transported by **CES Environmental Services, Inc.**), and **Customer** Waste Shipments bound for **CES Environmental Services, Inc.** that **CES Environmental Services, Inc.** Subcontracts to 3rd Party Transporters, **Customer Service and Inside Sales Representatives** print and will give Essential Operating Paperwork directly to the **Main Processing Facility** Personnel. The **Main Processing Facility** Personnel shall immediately put this Paperwork in the **Main Processing Facility Laboratory** in an Inbox Titled Subcontracted Transportation. For all the above Listed Items (where **CES Environmental Services, Inc.** is not the Transporter), **Customer Service and Inside Sales Representatives** are required to print a Bill Of Lading and/or Manifest as well as a complete Job Information Profile.

For completed Loads picked up at a **Customer** and dropped at an off-site Facility, all Essential Operating Paperwork should be turned in at the **Main Office** as instructed in 5) hereinafter. Procedures for Loads received at **CES Environmental Services, Inc.** or Shipped from **CES Environmental Services, Inc.** are discussed in 3) and 4) hereinafter.

3) Receiving Loads at CES Environmental Services, Inc.:

The First thing that must be done is that all **Drivers** must Sign the Driver Sign-In Sheet located on the Driver Sign-In Clipboard just outside the **Main Processing Facility Laboratory**.

Next, for Loads Inbound for **CES Environmental Services, Inc.**, **CES Environmental Services, Inc. Drivers** and **Subcontracted Drivers** should present all Manifests, Bills Of Lading, and associated Weight Tickets to the **Main Processing Facility Personnel** (including Manifests and Bills Of Lading destined for other Facilities not yet delivered or "In-Transit"). The **Main Process Facility Personnel** must immediately write the Trailer Number at the top of each Manifest or Bill Of Lading.

Next, concerning Loads Inbound for **CES Environmental Services, Inc.**, **Main Process Facility Personnel** will immediately place the Paperwork in the appropriate Inbox Titled either Un-Received Bulk Load Manifests or Un-Received Drum Load Manifests. Manifests and Bill Of Ladings will stay in these Boxes until a Sample has been taken, the Loads analyzed and properly documented, and treatment/handling determinations have been made. Once the Loads are ready to be officially received and processed, the **Main Processing Facility Personnel** will Sign and/or keep all Copies except the Transporter Copy for **Outside Transporters**. The **Outside Transporter's** Copy should be returned to **Subcontracted Drivers** by immediately placing it outside the **Main Processing Facility Laboratory** in the Inbox Titled Outside Driver Manifests). For **CES Environmental Services, Inc. Drivers**, the Transporters Copy shall be left attached.

Manifests or Bills Of Lading brought in by **CES Environmental Services, Inc. Drivers** after Hours or when no **Main Processing Facility Personnel** are working should be placed in the **Main Processing Facility Laboratory** in the Inbox Titled After Hours Manifests and Bill Of Ladings.

For all Loads that will not be received by **CES Environmental Services, Inc.** and will be Outbounded to other Facilities, the **Laboratory Technicians, Laboratory Research and Development, Laboratory Lead Man** or the **Laboratory and Quality Assurance Supervisor** will email this Information to the **Logistics Supervisors, Director of Logistics and Customer Service,** and **Customer Service and Inside Sales Representatives** to ensure that these Loads are Redirected by Creating and Scheduling the Job (using the same Paperwork so the Job is not complete yet), the **Main Processing Facility Personnel** will make Copies of Manifests and Bills Of Lading and place Copies in an Inbox in the **Main Processing Facility Laboratory** Titled Outbound "In-Transit" Loads-Paperwork Copies. They will then immediately place all the Manifests, Bill Of Lading, Weight Tickets, etc. in the Inbox Titled Completed Manifests and Bill Of Ladings.

***Note:** These Copies will assist **Main Processing Facility Personnel** in Tracking Wastes/Materials that will be later Shipped Off Site. Such Copies will be immediately purged from this Inbox once the Wastes/Materials have been Shipped Off Site.

Certain loads will arrive at CES and cannot be officially received for some of the following reasons:

The Load does not meet specifications (as spelled out in the **CES Environmental Services, Inc.** Profile), the Load requires further Analysis and/or QC by the **Main Processing Facility Personnel** to determine if **CES Environmental Services, Inc.** can Legally and Technically or Physically treat the Load, the Load must be held for a period of time and may be processed at a later Date.

In such cases, the original Manifest and/or Bill Of Lading and Weight Tickets will be temporarily placed in an Inbox in the **Main Processing Facility Laboratory** Titled Received Loads in Processing (Copies Only) and Un-Received Loads Pending Additional Analysis (Originals). Once a determination has been made, the Load will either be rejected or received as normal.

For all other Manifests and Bills Of Lading to be officially received by **CES Environmental Services, Inc., Main Processing Facility Personnel** will then separate the "Designated Facility Copy" and place these Copies in the Inbox Titled Designated Facility Copies (Manifests, Bill Of Ladings, etc.).

Accept for the following exceptions, the remaining original Copies of Manifests and Bills of Lading will be placed in an Inbox in the **Main Processing Facility Laboratory** Titled Completed Manifests and Bill Of Ladings:

For Loads that have been officially Received, Signed, and Terminated, but will be re-shipped immediately to another Facility (without any Handling or Processing), the **Main Processing Facility Personnel** shall make a Copy of the Paperwork and place it in the Inbox Titled Received Waste Loads-Ready for Re-Shipment Out (Copies Only). Only then shall they place the remaining Paperwork in the Inbox Titled Completed Manifests and Bill Of Ladings.

> ***Note:** Such Copies will be used by the **Main Processing Facility Personnel** to Track and Communicate with **Customer Service and Inside Sales Representatives** the re-shipment of such Loads. Once such Loads have been re-shipped Off Site, this Paperwork will be purged from this Inbox.

For Loads that have been Sampled, Manifests/Bill Of Ladings validated, QC run, officially accepted, and are ready to unloaded, but will be unloaded at a later time, the remaining Paperwork shall be place in the Inbox Titled Received Loads On-The-Line and Ready to Unload (Originals). After which time the Loads are actually unloaded, the remaining Paperwork shall be placed in the Inbox Titled Completed Manifests and Bill Of Ladings.

For Loads that have been officially received, but will need special Handling/Processing, a copy of the original Manifest and/or Bill Of Lading will be placed in the **Main Processing Facility Laboratory** in the Inbox Titled Received Loads in Processing (Copies Only) and Un-received Loads Pending Additional Analysis (Originals). The Original Paperwork will be placed in the Completed Manifests and Bill Of Ladings Box in the **Main Processing Facility**.

***Note:** Such Copies will be used by the **Main Processing Facility Personnel** to Track the work that needs to be performed on such Loads. Once the Processing/Handling is complete, these Copies will be purged from this Inbox.

For all Incoming Products and all off-spec Wastes/Materials, the **Main Processing Facility Personnel** will Fill out an Inbound Loads Report in accordance with the Process Facility Information listed in the Profile in the CES Access Database. The Pink Copy will be placed in the Inbox Titled Completed Inbound/Outbound Load Reports (Facility Copies Only). The remaining Copies will be stapled to the Manifests and Bills Of Lading and placed in the **Main Processing Facility Laboratory** in the Inbox Titled Completed Manifests and Bill Of Ladings.

4) Shipment of Loads of Waste and Product from CES Environmental Services, Inc.:

For all products shipped from **CES Environmental Services, Inc.**, the **Logistics Supervisors** will take the Essential Operating Paperwork to the **Main Processing Facility Laboratory** for Loads leaving **CES Environmental Services, Inc.** the following Day. The Essential Operating Paperwork will be delivered in **Driver's** Packets and placed in the Inbox Labeled Subcontracted Drivers. It is the responsibility of the **Main Processing Facility Laboratory Personnel** to be sure the appropriate Trailers are Unloaded, Cleaned or Loaded and that Samples are pulled and QC'd in a timely manner so the Loads may leave **CES Environmental Services, Inc.** as Scheduled.

The **Main Processing Facility Personnel** should contact the **Processing Manager** or the **Director of Processing** if a problem arises such that the Load will not be ready to Ship. Otherwise, the **Main Processing Facility Personnel** will Sign the as the **Shipper** (Bill Of Lading) or the **Generator** (Manifest), indicating to the **Driver** that the Load is ready to Ship. UNDER NO CIRCUMSTANCES should a **Driver** leave **CES Environmental Services, Inc.** without the Paperwork Signed.

For all products shipped from **CES Environmental Services, Inc.**, **Main Processing Facility Personnel** will complete an Outbound Load Report in accordance with Process Facility Information listed in the Profile in the CES Access Database. Once complete, this Form and all Copies should be placed in the **Main Processing Facility**

Laboratory in the Inbox Titled Completed Outbound Load Reports (Ready to be Shipped). The Form should remain in this Inbox until the time of Shipment.

Concerning Loads that are picked up at **CES Environmental Services, Inc.** (Waste or Product) by **CES Environmental Services, Inc. Drivers** or **Subcontracted Drivers** (as discussed earlier in this SOP), the **Customer Service and Inside Sales Representatives** should print all Essential Operating Paperwork and place them in the **Main Processing Facility Laboratory** in the Inbox Titled Subcontracted Transportation (as discussed earlier in this SOP). Upon arrival of the **Driver** to get the Load, the **Main Processing Facility Personnel** must do the following:

For Waste Loads, Sign the Manifest and keep the appropriate designated Facility Copy of Manifests. This Copy should be placed in the Inbox Titled Completed Manifests and Bill Of Ladings. Give the remaining Copies to the **Driver**.

> ***Note:** In this regard, all **Drivers** (including **CES Environmental Services, Inc. Drivers**) will treat the **Main Processing Facility** as if they were making a pick-up at any other **Customer**.

For Product/Material Loads, remove the Outbound Load Report from the Inbox Titled Completed Outbound Load Reports (Ready to Ship), Sign the Outbound Load Report and detach the Pink Copy and place it in the Inbox Titled Completed Inbound/Outbound Load Reports (Facility Copies Only). Remove the Bill Of Lading and Job Information Profile from the Inbox Titled Subcontracted Transportation. Sign the Bill Of Lading and remove the designated Facility Copy. Remove the Yellow Copy (**CES Environmental Services, Inc.** Office Copy) of the Outbound Load Report. Staple the Yellow Copy of the Outbound Load Report and the all Copies of the Job information Profile (relating only to Loads not transported by **CES Environmental Services, Inc. Drivers**) to the back of the designated Facility Copy of the Bill Of Lading and place the Bundle in the Inbox Titled Completed Manifests and Bill Of Ladings.

Paperwork from the **Main Processing Facility** to the **Main Office:**

At the very beginning of each Day, the **Main Processing Facility Personnel** will remove all Paperwork from the Inbox Titled Completed Manifests and Bill Of Ladings and carry it to the **Main Office**. They shall place all In-Transit Manifests/Bill Of Ladings in the Inbox Titled In-Transit Manifests. They shall place the balance of this Paperwork in the Inbox Titled Completed Manifests & Bill Of Ladings (Process Facility).

At the very beginning of the Day, remove the Paperwork form the Inbox Titled Designated Facility Copies (Manifests, Bill Of Ladings, etc.) and take it the **Health, Safety, and Environmental Manager's Office** and place it in the Inbox Titled Steers Reporting.

The **Health, Safety, and Environmental Manager** will enter these into Steers, if applicable, then File all the Paperwork (Steers reportable or not) back in the **Main Processing Facility** on a Monthly basis.

5) **Completion of Essential Operating Paperwork-Drivers:**

Drivers should turn in remaining Essential Operating Paperwork at the **Main Office**. Driver Daily Logs should be placed in the Inbox Titled Completed Driver Daily Logs. Driver's Vehicle Inspection Reports, Trailer Inspection Forms, and Roll-Off or Tote Container-Level 1 Inspection Forms should be place in the Inbox Titled Completed Driver's Vehicle Inspection Reports and Roll-Off or Tote Container Inspection Forms and Trailer Inspection Forms. The remaining Essential Operating Paperwork should be placed in the Inbox Titled Completed Driver's Paperwork.

6) **Completion of Essential Operating Paperwork-Logistics:**

The Inboxes Titled Completed Driver's Paperwork will be removed and appropriately reviewed by the **Logistic Supervisors**. First, the **Logistic Supervisors** will review the Transportation Work Tickets to ensure they are Filled out correctly and obtain the Pink Copies for the **Fleet Maintenance and Equipment Manager**. The Pink Copies will then be placed in the **Main Office** Inbox for the **Fleet Maintenance and Equipment Manager**. The **Fleet Maintenance and Equipment Manager** shall enter the Mileage from these Forms in the CES Access Database to Track Tractor Miles for doing PM work. These Pink Copies may then be discarded.

Logistic Supervisors shall next remove the **Customer's** Copy of all Federal Manifest and City of Houston Manifests and place them in the **Health, Safety, and Environmental Manager's Office** in the Inbox Titled General Manifest Copies (To Be Reviewed). The **Health, Safety, and Environmental Manager** will review each Manifest to ensure completeness, Log the Manifest in a Database to Track them, and then place the Manifest in the appropriate Inboxes Located near the **Administrative Assistants-General** Titled Generator Manifest Copies (Ready To Be Mailed) and Manifests To Be Mailed To City of Houston. The **Administrative Assistant-General** shall then mail the original Federal Manifests back to the **Customer** and the City of Houston Manifests to the City of Houston.

Finally, **Logistic Supervisors** shall place all **Driver** Fuel Receipts and Out of State Mileage Logs in the **Health, Safety, and Environmental Manager's Office** in the Inbox Titled Fuel Receipts and Out of State Mileage Logs. The **Health, Safety, and Environmental Manager** will File these Logs and Receipts to be used in completing IFTA Reports.

7) **Completion of Essential Operating Paperwork-Customer Service:**

Essential Operating Paperwork that is complete (i.e. no Paperwork is missing) shall be affixed together and immediately placed in the **Customer Service Office** in the Customer Service Essential Operating Paperwork Inbox Titled Complete Paperwork "Ready for Data Entry".

Essential Operating Paperwork that is not complete (i.e. Paperwork is still missing) shall be affixed together and Filed in the **Customer Service Office** in the Customer Service Essential Operating Paperwork Inbox Titled Partially Complete Paperwork until all Paperwork has been collected for the Job. Once assembled, the complete Paperwork shall then immediately be placed in the Customer Service Essential Operating Paperwork Inbox Titled Complete Paperwork "Ready for Filing".

The **Customer Service and Inside Sales Representatives** shall remove the Paperwork for the **Customer Service Office** Inbox Labeled Complete Paperwork "Ready for Data Entry" and enter the appropriate Information into the CES Access Database. The Information to be entered is the Manifest/Bill Of Lading Number, Quantity, Pounds, and mark the Job as Complete. After entering the Information, the **Customer Service and Inside Sales Representatives** need to place the Paperwork in the **Customer Service Office** Inbox Labeled Complete Paperwork "Ready to File".

Tank Wash: The **Customer Service and Inside Sales Representatives** shall remove the Tank Wash Tickets from the **Customer Service Office** Inbox Labeled Completed Tank Wash Tickets. The **Customer Service and Inside Sales Representatives** must review each Tank Wash Ticket to ensure the work is Billable and write the **Customer** Folder Id on each Ticket. After completion, the **Customer Service and Inside Sales Representatives** need to place the Tickets in the **Customer Service Office** Inbox Labeled Complete Paperwork "Ready to File".

On a Daily Basis, **Customer Service and Inside Sales Representatives** shall ensure that Essential Operating Paperwork in the Customer Service Essential Operating Paperwork Inbox Titled Complete Paperwork shall be Filed in the correct **CES Environmental Services, Inc.** Job Folders for later Billing by the **AP/AR Department**.

The Inbox Titled In-Transit Shipments shall also be removed by **Customer Service and Inside Sales Representatives** for future Packaging with **Driver's** Paperwork to be placed in the Driver Job Inboxes (unless a **Driver** must otherwise remove it sooner). The Inbox Titled Driver's Daily Logs will be emptied and entered into the CES Access Database each Day by the **Logistics Supervisors**. After review, the **Logistics Supervisors** shall place the Logs in the **Health, Safety, and Environmental Manager's Office** in the Inbox Titled Complete Driver's Daily Logs "Ready to File". The **Health, Safety, and Environmental Manager** shall then ensure Final Filing of the Driver's Daily Logs.

The Inbox Titled Completed Driver's Vehicle Inspection Reports & Roll-Off or Tote Container Inspection Forms & Trailer Inspection Forms shall be inspected first each Day by the **Fleet Maintenance and Equipment Manager** to detect any Equipment needing Repair. If Repair is needed, the **Fleet Maintenance and Equipment Manager** shall remove the Essential Operating Paperwork, and do as below instructed.

Remaining Essential Operating Paperwork in the Inbox Titled Completed Driver's Vehicle Inspection Reports & Roll-Off or Tote Container Inspection Forms & Trailer Inspection Form will be emptied and reviewed each Day by the **Logistics Supervisors** to ensure **Driver's** properly completed the Paperwork. After review, the **Logistics Supervisors** shall place all Three of these Forms in the **Health, Safety, and Environmental Manager's Office** in the appropriate Inboxes Titled Complete Vehicle Inspection Reports "Ready to File", Complete Trailer Inspection Forms "Ready to File", or Complete Roll-Off or Tote Container-Level 1 Inspection "Ready to File". The **Health, Safety, and Environmental Manager** shall then ensure this Paperwork is properly Filed in the Equipment and Maintenance Files.

For Essential Operating Paperwork removed from the Inbox Titled Completed Driver's Vehicle Inspection Reports & Roll-Off or Tote Container Inspection Forms & Trailer Inspection Forms by the **Fleet Maintenance and Equipment Manager** (that denote Damage), the **Fleet Maintenance and Equipment Manager** shall complete an Equipment and Facility Work Order, affix it to the Form indicating the damage/problem, and place the Forms in the **Fleet Maintenance and Equipment Office** in an Inbox Titled Incomplete Work Orders.

If it is deemed by the **Fleet Maintenance and Equipment Manager** that Damages were caused by **CES Environmental Services, Inc. Customers**, the **Fleet Maintenance and Equipment Manager** will immediately notify the appropriate **Customer Service and Inside Sales Representatives** (via email) so that the **Customer** can be notified about the charges (the **Customer Service and Inside Sales Representatives** will make a Note in the Access Program under Billing Comments about the charges). The **Fleet Maintenance and Equipment Manager** should also be sure to note the **Customer** and Job on the Equipment and Facility Work Order.

Immediately upon completion of the Equipment Repair, the **Fleet Maintenance and Equipment Manager** should Sign all Essential Operating Paperwork in the area designated for Mechanic's Signature. Next, **Fleet Maintenance and Equipment Manager** should remove the Golden Rod Copy of the Equipment and Facility Work Order and place it in the **Main Office** in the Main Office Inbox for the appropriate **Customer Service and Inside Sales Representatives**. The **Customer Service and Inside Sales Representatives** will immediately File the Equipment and Facility Work Order in the correct **CES Environmental Services, Inc.** Job Folder for later use by the **AP/AR Department**. The **Fleet Maintenance and Equipment Manager** should also place the Signed Essential Operating Paperwork in the **Main Office** in the **Health, Safety, and Environmental Manager's Office** in the appropriate Inboxes

Titled Complete Vehicle Inspection Reports "Ready to File", Complete Trailer Inspection Forms "Ready to File", and Complete Roll-Off or Tote Container Inspection Forms "Ready to File".

Standard Operating Procedure

THINK... USE GOOD JUDGMENT	CES Environmental Services, Inc.	YOUR ATTITUDE COUNTS
Date Issued: 10/11/2006	DEPARTMENT(S): -Operations -Processing -Sales, Finance, and Administration	Revised Date: 10/28/2008
Policy Number: 06-013	SOP Title: CES Environmental Services, Inc. Profiles	SOP Description: Defines the method for which CES Environmental Services, Inc. Profiles are to be filled out and turned in for Materials coming to CES Environmental Services, Inc.

This Standard Operating Procedure (SOP) outlines the Profiling Requirements and Procedures for Materials coming to **CES Environmental Services, Inc.** for Management, Handling, and Disposal or Recycling.

CES Waste Profiles must be filled out completely with accurate and up to Date information for all Materials handled at the **CES Environmental Services, Inc.** Facility. This includes Non-Hazardous Waste, Recyclable Oily Water Mixtures, Used Oil and Used Oil Filters, Universal Waste, Empty Containers for Recycle, Used Hazardous Wastewater, Antifreeze, Hazardous and Non-Hazardous Wastes for Recycling. CES Material-Product Profiles must be used when Profiling either Products or Wastes which would be excluded from the Definition of Waste because of the method of Management. CES Waste Profiles and CES Material-Product Profiles can be obtained in the Profiles Folder located on the Shared Drive.

Step #1: Profile Completion and Submittal:

CES Profiles (including **CES Environmental Services, Inc.** Internal Use Only Process Facility Information) will be completed by the **Customers**, **Sales Representatives** and/or **Customer Service and Inside Sales Representatives**. If a **Sales Representative** would like the **Customer Service and Inside Sales Representatives** to Complete and Submit Profiles, then the **Sales Representative** will Log the Profile Request in the Customer Service Log In Sheet located on the **Customer Service and Inside Sales Representatives'** Desk. The following is the list of the different Categories of Materials to be Profiled to **CES Environmental Services, Inc.**, with the required supporting documentation and **Customer** Signature Requirements.

Type of Material	*Additional Requirements*	*Customer Signature*
Non-Hazardous Waste	Generator Knowledge TCLP Analytical MSDS	Yes
Universal Waste	Generator Knowledge TCLP Analytical MSDS	Yes
Empty Containers (Recycle)	MSDS of Last Contents	No
Used Oil/Filters	Analysis Per 40 CFR 279.11	No
Products	MSDS	Yes
Recyclable Hydrocarbon and Water Mixture	Generator Knowledge TCLP Analytical MSDS	Yes
Antifreeze	MSDS	No
Hazardous and Non-Hazardous Wastes for Recycling	Generator Knowledge TCLP Analytical MSDS TCEQ Form 00525	Yes
Hazardous Wastewater	Generator Knowledge TCLP Analytical MSDS LDR Documents	Yes

Process Facility Information:

Process Facility Information is very important since it explains how the Materials should be handled when it is received by **CES Environmental Services, Inc.** (if applicable).

Contamination Limits:
These are Conformance Limits-the Limits over which Surcharges will apply.

Surcharges:
May put "See General Rate Sheet" if applicable. If there is a maximum Surcharge Amount before redirection to another location, please enter that Information here. Unless otherwise stated here, the **Sales Representative**

will be called for approval before receiving a Load for which Surcharges will apply.

Special Testing:

Please put any Testing Requirements here. The results of Testing Requirements will be entered on the Inbound/Outbound when applicable according to the Shipping and Receiving Loads Standard Operating Procedures.

Treatment and Handling:

Enter any Treatment or Handling Procedures here. Examples may include "Process to Class I Solids Bin," "Process to Fuels Blending" or Odor Mitigation Procedures.

Note: Due to **CES Environmental Services, Inc.** Commitment to Control Odor, it is imperative that Odor Control Procedures are established prior to the receipt of any Odorous Loads or the approval of Profiles for any Odorous Materials. The **Laboratory and Quality Assurance Supervisor** is responsible for establishing Protocols that will Mitigate the Odor of any Materials identified as Odorous to an acceptable level. These Protocols will be recorded in the Treatment and Handling Section of the Process Facility Information. It is the responsibility of the **Sales Representatives** to ensure that all Odorous Materials are identified as such and Samples are submitted to the **Laboratory** so Odor Control Procedures may be established prior to the receipt of any such Loads.

Test for Product Recovered/Recycled:

If this Inbound Material might be Outbounded as a Product or a Recyclable, enter any Testing that would be required to determine Pricing, Markets, etc. on Outbound Material.

Management of Product Recovered Recycled:

If this Inbound Material might be Outbounded as a Product or a Recyclable, enter any Material Handling or Management Requirements.

Note: For situations such that the **Sales Representative** does not have enough Information or knowledge to complete the Process Facility Information, the **Sales Representative** should consult with the **Laboratory and Quality Assurance Supervisor**.

Step #2: Profile Approval Process:

Completed CES Waste Profiles and CES Material-Product Profiles as described above should be submitted to the **Health, Safety, and Environmental Manager** for Preliminary Review in the Inbox Titled Profiles-To Be Reviewed located in the Office of the **Health,**

Safety, and Environmental Manager. Normal Profile approvals will require 48 Hours for approval and assignment of the CES Profile Number and approval Date. However, if an Emergency Situation exists, the **Sales Representative** may "walk" the Profile through Approval Process for a more immediate approval.

Once a Profile is approved by the **Health, Safety, and Environmental Manager**, the Profile goes into the Inbox Titled Profiles-To Be Reviewed by Laboratory and Quality Assurance Supervisor located in the Office of the **Health, Safety, and Environmental Manager**. Once a Day the **Laboratory and Quality Assurance Supervisor** will review Profiles in this Box. The **Laboratory and Quality Assurance Supervisor** will scrutinize the Process Facility Information and contact the appropriate **Sales Representative** to discuss any changes that need to be made. The **Laboratory and Quality Assurance Supervisor** will make the necessary changes and if the **Laboratory and Quality Assurance Supervisor** also approves the Profile, **Laboratory and Quality Assurance Supervisor** will Initial Front of Profile and place Profile in the **Health, Safety, and Environmental Manager's** Inbox (located in the **Main Office** area).

Profile Discrepancies:

If the **Health, Safety, and Environmental Manager** feel that the Profile is insufficient or inaccurate, it will be returned with the CES Profile Discrepancy Form (in the Profiles Folder located on the Shared Drive) to the Inbox of the appropriate **Sales Representative** or **Customer Service and Inside Sales Representative** to address any and all concerns and subsequent re-submittal. The CES Profile Discrepancy Form will outline all issues that need correction.

If the **Health, Safety, and Environmental Manager** has a question about the Profile and feels it might require further consideration, the **Health, Safety, and Environmental Manager** will place the Profile into the Inbox Titled Profiles-Preliminary Approval located in the Office of the **Health, Safety, and Environmental Manager** to be reviewed by the **President**.

If review by the **President** is required and the **President** feels that the Profile is insufficient, the Profile will be returned with the CES Profile Discrepancy Form to the Inbox of the appropriate **Sales Representative** or **Customer Service and Inside Sales Representative** to address any and all concerns and subsequent re-submittal. The CES Profile Discrepancy Form will outline all issues that need correction. After correction, the Profile should be Resubmitted (with corrections made) with the CES Profile Discrepancy Form attached. The Forms should simply be put back in the Inbox Titled Profiles-To Be Reviewed.

If the review is required by the **President** and the **President** feels that the Profile is fit for approval, the Profile goes into the Inbox Titled Profiles-To Be Reviewed by Laboratory and Quality Assurance Supervisor located in the Office of the **Health, Safety, and Environmental Manager**.

Profile Approval:

Once Final Approval status has been granted for the Profile, the **Health, Safety, and Environmental Manager** will enter all Information into the CES Access Program and assign a CES Profile Number and approval Date. A Copy of the Profile with Copies of all supporting documentation will be placed in the appropriate **Sales Representative's** Inbox to be Filed in the appropriate Job Folder.

The **Health, Safety, and Environmental Manager** will create a File and place a Second Copy of the Profile (and all supporting documentation) in the **Main Processing Facility**. This File will be designated as a Waste Stream Folder. Specifically, the **Health, Safety, and Environmental Manager** shall place this Folder and its contents in the Office of the **Laboratory and Quality Assurance Supervisor** in the Inbox Title New Waste Stream Folders-Ready for Filing. The **Laboratory and Quality Assurance Supervisor** shall ensure that such Folders are Filed in the Waste Stream Files at least One time per Week.

Step #3: Profile Re-Certification:

Profiles will require a Complete Recertification every 2 Years performed by the **Sales Representative** and/or **Customer Service and Inside Sales Representative**. On a Monthly Basis, each **Customer Service and Inside Sales Representative** shall Query the CES Access Database to determine which Profiles need to be Recertified in the following Month. Recertifications are then initiated by the **Customer Service and Inside Sales Representatives.**

CES Waste Profile Re-Certification Forms are located in the CES Access Database as a Tab in the Profile. These Forms should be printed for each Stream that will Expire and placed in the Inbox of the appropriate **Sales Representative**. The **Sales Representative** will then remove and discard the Streams that are no longer active or do not need to be re-certified.

The **Sales Representative** should then write the most current Contact Information on the remaining Forms (which do require Certification) and Check the appropriate Box: "Analysis is not Required for Recertification" or "The following Analysis is required for Recertification". If Analysis is required, the **Sales Representative** must further Check each Box indicating which Analysis is required. The **Laboratory and Quality Assurance Supervisor** can help make this determination.

The **Sales Representative** will then place the Forms in the Inbox of the appropriate **Customer Service and Inside Sales Representative**. The **Customer Service and Inside Sales Representative** will then send the Form to the **CES Environmental Services, Inc. Customer** for Signature and Completion.

Completed CES Waste Profile Re-Certification Forms will be returned to the **Customer Service and Inside Sales Representative** who will make a Copy and File the Copy in the appropriate **Customer** Job Folder and Submit the CES Waste Profile Re-Certification Form with supporting documentation to the **Health, Safety, and Environmental Manager** for review. The **Health, Safety, and Environmental Manager** who will update the Profile Status in the CES Access Program and take the CES Waste Certification Renewal Form to the Office of the **Laboratory and Quality Assurance Supervisor** and File it in the correct (existing) Waste Folder.

CES Environmental Services, Inc. Waste Permit #39048 does require that New Analytical be performed with each Recertification; therefore, no CES Waste Profiles are to be approved with TCLP Analytical that is Older than 2 Years.

Step #4: Profile Modifications:

A Profile Modification Form (located in Forms and Logos Folder on the Shared Drive) must be completed for any Profiles requiring modification. A Copy of the Original Profile (located in the CES Access Database) must be attached along with any additional Analysis, MSDS or other documentation. This packet will be submitted to the **Health, Safety, and Environmental Manager** for Preliminary Review in the Inbox Titled Profiles-To Be Reviewed located in the Office of the **Health, Safety, and Environmental Manager**.

The Profile Modification Process will be the same as the Profile Approval Process-see above-except that a New Profile Number will not be generated. Rather, once the modifications have been approved through the process explained above, the **Health, Safety, and Environmental Manager** will make the changes to the existing Profile in the CES Access Database and will not make a New Waste Stream Folder.

The **Health, Safety, and Environmental Manager** will replace the Original Profile with the Modified Profile (along with all supporting documentation) in the Waste Stream Folder located in the **Main Processing Facility** in the **Laboratory and Quality Assurance Supervisor's** Office.

The **Health, Safety, and Environmental Manager** will also give a Copy of the Modified Profile (along with all supporting documentation) to the **Sales Representative** or **Customer Service and Inside Sales Representative** making the Modification Request. The **Sales Representative** or **Customer Service and Inside Sales Representative** making the Modification Request will File this Modified Profile and supporting documentation in the correct Job Folder.

Standard Operating Procedure

THINK... USE GOOD JUDGMENT	CES Environmental Services, Inc.	***YOUR ATTITUDE COUNTS***
Date Issued: 09/14/2006	DEPARTMENT(S): -Operations -Processing -Tank Wash -Transportation -Maintenance and Field Services -Sales, Finance, and Administration	Revised Date: 10/22/2008
Policy Number: 06-002	SOP Title: Creating, Using, and Maintaining Standard Operating Procedures	SOP Description: Gives description for SOP Creation, Training, Use, Storage, Maintenance, etc.

1) All Standard Operating Procedures (SOPs) may be Created by any, all or any combination of the following Parties: **President, Vice President of International Business, Vice President of Operations and Maintenance, Vice President of Accounting, Finance, Sales, and Administration**, and/or **Systems Analysis and Quality Control** (after approval from the **President**). Specific SOPs should be initiated by the Party most directly affected by its Creation.

   SOPs should be Created and Used for Multi-Step Procedures where standardization is deemed important or critical to operational success. The SOP will be very descriptive (using proper Names and Titles), sequential, and complete. The goal in creating the SOP shall be to Create a Standard Policy which will harmonize separate **CES Environmental Services, Inc. Employee** efforts into a cohesive force, achieving desired results. The SOP shall be designed to work in every instance each time it is followed.

2) For SOPs involving and affecting only a Single Department, the SOP should be initiated by the **Vice President** and/or **Upper Level Manager** of that Department and Submitted to the **President** and the **Systems Analysis and Quality Control** (via email) using the official **CES Environmental Services, Inc.** Form Titled Standard Operating Procedure. The **President** will either approve the SOP (via email back to the submitting **Vice President** and/or **Upper Level Manager**) or communicate with the submitting **Vice President** and/or **Upper Level Manager** concerning the SOP. In the case where further discussion is required and once the best solution has been determined, the submitting **Vice President** and/or **Upper Level Manager** shall

resubmit the Revision back to the **President** and the **Systems Analysis and Quality Control** (via email).

For SOPs involving/affecting Two or More Departments, the most affected Party should discuss the Creation of a New SOP first with the **President** and the **Systems Analysis and Quality Control**. The **President** shall then have Group or Individual discussions with all Parties involved to determine the best overall solutions to be promulgated on the New SOP. The **President** and/or **Systems Analysis and Quality Control** shall then write the SOP using the official **CES Environmental Services, Inc.** Form Titled Standard Operating Procedure.

3) For New SOPs, the **President** and/or **Systems Analysis and Quality Control** will email the Draft Version of the SOP to each **Vice President** and **Upper Level Manager** for concurrence. The **President** and/or **Systems Analysis and Quality Control** will email the finalized SOP to each **Vice President** and **Upper Level Manager**. The **President** and/or **Systems Analysis and Quality Control** will then copy in the Standard Operating Procedure and place it on the Shared Drive.

4) Each **Vice President** and **Upper Level Manager** shall immediately be responsible for training the **CES Environmental Services, Inc. Employees** working under their Management to ensure rapid and proper Implementation and Use.

5) For Revisions made to existing SOPs, the **President** and/or **Systems Analysis and Quality Control** will email the appropriate **Departments** the revised SOP with the updates Highlighted in Yellow and should be made using the same procedure (as above depicted) for the Initial Creation of the SOP.

Upper Level Management may cause established Standard Operating Procedures to be changed only by following the proper protocols.

If other **CES Environmental Services, Inc. Employees** feel that changes in the established Standard Operating Procedures should be made, they should follow the **Chain of Command** and contact their **Upper Level Manager** concerning the issue(s).

No **CES Environmental Services, Inc. Employees** shall change established Standard Operating Procedures without following the proper protocol for achieving such results.

CES Company Policy

THINK... USE GOOD JUDGMENT	CES Environmental Services, Inc.	YOUR ATTITUDE COUNTS
Date Issued: 12/09/2008	DEPARTMENT(S): -Operations -Processing -Tank Wash -Maintenance and Field Services -Sales, Finance, and Administration	Revised Date: 00/00/0000
Policy Number: 08-019	Policy Title: Company Cell Phones	Policy Description: This Policy explains the usage of the CES Environmental Services, Inc. Company Cell Phones.

1. The Company Cell Phone you have been issued is for Company Business only and is property of **CES Environmental Services, Inc.** However, within reason, **Employees** can use the Company Cell Phone to make and receive personal calls. Any additional costs associated with personal use are the responsibility of the **Employee**.

   - Downloading Music, Pictures, and Video Games are not permitted. Any costs associated with unauthorized Downloads will be deducted from your pay check.

   - Unless expressly approved by **Upper or Mid Level Management**, Text Messaging will not be allowed. Any costs associated with unauthorized Text Messaging will be deducted from your pay check.

   - Unless expressly approved or amended by **Upper or Mid Level Management,** 500 Peak Minutes are allotted for General **Employees**, 1500 Minutes for **Mid Level Managers**, and unlimited for **Sales Representatives, Customer Service and Inside Sales Representatives, Customer Service and Inside Sales-Product Sales**, and **Upper Level Managers**. $0.20 per Minute will be charged for Minutes over allotted amount. There are no unlimited Nights and Weekends only Mobile to Mobile.

2. The Company Cell Phone issued is your responsibility. If the Company Cell Phone is lost or stolen, **CES Environmental Services, Inc.** will charge back to you the Insurance Deductible associated with the replacement of your lost or stolen phone.

3. If your Company Cell Phone/Equipment is lost, damaged or stolen due to work related activities, **CES Environmental Services, Inc.** will review each occurrence and determine if the cost to replace or repair the Company Cell Phone/Equipment will be charged back to the **Employee** responsible for the Company Cell Phone/Equipment or if **CES Environmental Services, Inc.** will absorb the cost of repair or replacement.

4. **CES Environmental Services, Inc.** will deduct any costs associated with the Company Cell Phones from the **Employees** next pay check following **CES Environmental Services, Inc.** receiving the Company Cell Phone Bill. No exceptions!

5. If you have any issues with your Company Cell Phone, please bring them to the **Human Resources and Support Services Supervisor's** attention.

Failure to adhere to the instructions outlined in this Policy may result in Disciplinary Actions (reference the Policy on Disciplinary Policy) up to and including Termination.

Employee Signature: ______________________________ Date: _______________

Employee Printed Name: ____

Standard Operating Procedure

THINK... USE GOOD JUDGMENT	CES Environmental Services, Inc.	YOUR ATTITUDE COUNTS
Date Issued: 10/07/2008	DEPARTMENT(S): -Operations -Processing -Transportation -Tank Wash -Maintenance and Field Services -Sales, Finance, and Administration	Revised Date: 00/00/0000
Policy Number: 08-063	SOP Title: Odor Flags for Trailers, Roll-Off Boxes, and Frac Tanks	SOP Description: Defines the method for identifying odorous loads on CES Environmental Services, Inc. Property.

This Standard Operating Procedure (SOP) outlines the procedures that should be followed for odorous loads in Trailers, Roll-Off Boxes, and Frac Tanks while on **CES Environmental Services, Inc.** Property.

1 Purpose

The purpose of this SOP focuses on **CES Environmental Services, Inc.** commitment to control odor on the Property by identifying odorous loads that are contained in Trailers, Roll-Off Boxes, and Frac Tanks using an Orange Bicycle Flag.

Therefore, it is imperative that all **CES Environmental Services, Inc. Employees** follow this SOP.

2 General Information

The **Main Processing Facility Laboratory** will have all Orange Bicycle Flags and the **Tank Wash Office** will have all Orange Bicycle Flags with the letters TW on both sides.

All Orange Bicycle Flags will be affixed to the front of Trailers using a clamp and will be affixed to Roll-Off Boxes and Frac Tanks using a magnet.

3 Procedures

When the **Main Processing Facility Laboratory** receives a Bill of Lading and/or a Manifest from a **Driver** then the following steps should be performed:

1. The **Laboratory Technician** will review the Bill of Lading and/or Manifest and determine if this load could potentially be odorous.

2. If the **Laboratory Technician** determines the load is odorous then the **Laboratory Technician** will give an Orange Bicycle Flag to the **Drum Processing Technician** or **Wastewater Processing Technician** before sampling the Trailer, Roll-Off Box or Frac Tank. Reference Standard Operating Procedures on Odor Management-Sampling Odorous Materials, on Shipping and Receiving Loads-Sample Management (Main Processing Facility Laboratory), and on Shipping and Receiving Loads-Receiving Loads (Main Processing Facility Laboratory).

3. The **Drum Processing Technician** or **Wastewater Processing Technician** will attach the Orange Bicycle Flag to the Trailer, Roll-Off Box or Frac Tank appropriately and tell the **Driver** to park the Trailer, Roll-Off Box or Frac Tank across from the **Tank Wash** and adjacent to the **Motor Oil Facility** off of the Wayland Street Fence.

   The Orange Bicycle Flag will stay on the Trailer, Roll-Off Box or Frac Tank until it is ready to leave **CES Environmental Services, Inc.** Property.

4. When the Trailer, Roll-Off Box or Frac Tank is scheduled to leave **CES Environmental Services, Inc.** Property then the **Driver** will remove the Orange Bicycle Flag and return it to the **Main Processing Facility Laboratory**. Reference Standard Operating Procedure on Shipping and Receiving Loads-Shipping Loads (Main Processing Facility Laboratory).

When the **Tank Wash Office** receives a Bill of Lading, Manifest or Material Safety Data Sheet (MSDS) from a **Driver** then the following steps should be performed:

1. The **Tank Wash Supervisor** will review the Bill of Lading, Manifest, and/or MSDS and determine if this load could potentially be odorous. Reference Standard Operating Procedure on Flow of Essential Operating Paperwork (Tank Wash Only).

2. If the **Tank Wash Supervisor** determines the load is odorous then the **Tank Wash Supervisor** will attach the Orange Bicycle Flag with the letters TW on both sides to the Trailer, Roll-Off Box or Frac Tank appropriately and tell the **Driver** to park the Trailer, Roll-Off Box or Frac Tank across from the **Tank Wash** and adjacent to the **Motor Oil Facility** off of the Wayland Street Fence.

The Orange Bicycle Flag will stay on the Trailer, Roll-Off Box or Frac Tank until it is cleaned.

3. When the Trailer, Roll-Off Box or Frac Tank is cleaned then the **Tank Cleaner** will remove the Orange Bicycle Flag with the letter TW on both sides and return it to the **Tank Wash Office**. Reference Standard Operating Procedure on Odor Management-Cleaning Tanks.

Note: All Orange Bicycle Flags must stay on **CES Environmental Services, Inc.** Property at all times.

Standard Operating Procedure

THINK... USE GOOD JUDGMENT	CES Environmental Services, Inc.	***YOUR ATTITUDE COUNTS***
Date Issued: 10/04/2006	DEPARTMENT(S): -Operations -Processing -Maintenance and Field Services -Sales, Finance, and Administration	Revised Date: 11/25/2008
SOP Number: 06-006	SOP Title: Phone Answering	SOP Description: Defines which Department is responsible for Answering the Phone and when, including procedures to Direct Calls.

1.) Before 8 AM and after 6 PM, **Logistics Managers** and **Customer Services Representatives** will be responsible for answering incoming phones calls on the CES internal phone system.

2.) Between the hours of 8 AM and 6 PM, the **Office Manager** and all positions reporting to the **Office Manager** will be responsible for answering incoming phone calls on the CES internal phone system.

3.) Upon receipt of a phone call, obtain basic information such as name, company and what call is regarding from caller. If call is for CES personnel currently not at facility or in a position to not take the call, take a message and place in employee's in-box, or give to employee's supervisor if employee does not have an in-box or send the call to employee's voice mail.

4.) If call is for a CES **Sales Representative** and the **Sales Representative** is not in the office, offer to give the customer the **Sales Representative's** cellular phone number or offer to have the **Sales Representative** notified of the call and request for a return call.

5.) If CES receives an emergency call for a CES employee, take all pertinent information including caller's name, contact number and reason for call. If CES employee is available then immediately direct call to that person. If CES employee is not available, reassure the caller that their message will be relayed immediately, and the CES employee will call right back. Contact CES employee's direct supervisor, notify the supervisor of the emergency and instruct supervisor to contact CES employee and notify them immediately.

Standard Operating Procedure

THINK... USE GOOD JUDGMENT	CES Environmental Services, Inc.	YOUR ATTITUDE COUNTS
Date Issued 08/12/07	DEPARTMENT (S) - Operations - Processing - Maintenance and Field Services - Sales, Finance and Administration	Revised Date 00/00/00
Policy Number	SOP Title Personal Protective Equipment Policy	SOP Description Details policy for use of PPE at the CES Plant

REFERENCES: 29 CFR 1910.132, 29 CFR 1910.133, 29 CFR 1910.134, 29 CFR 1910.135, 29 CFR 1910.136, 29 CFR 1910.269 and CFR 1910.138.

Policy:

It is the policy of CES Environmental Services, Inc to provide CES people with equipment and additional Personal Protective Equipment PPE if needed to safely perform a job function. The equipment and PPE will meet or exceed all applicable standards for specific tasks or operations

Currently equipment must meet "American National Standards Institute" (ANSI) such as Z89.1, "Workers head protection", Z87.1, "Workers Eye Protection", and Z41.1, "Workers Foot Protection".

Training

Each CES employee who may need to wear PPE is trained on the use, care and sanitary requirements upon their hiring date. Retraining is provided annually to all CES employees. Training certification includes CES employee name, dates of training and the certification subject. Training includes but is not limited to;

- When PPE is necessary
- What PPE is necessary
- How to properly don, doff, adjust and wear PPE
- PPE limitations
- Proper care, maintenance, useful life and disposal of PPE

Retraining occurs when;

- The workplace changes
- Type of PPE changes
- CES employee demonstrates lack of use, improper use or insufficient skill or understanding of the proper use of PPE

1. **Hard hats** must be worn at all times in Operating Areas.

2. **Safety glasses** will be worn in all Operating Areas of the facility or specific job sites.

    A. CES Environmental Services, Inc will furnish non-prescription safety glasses.

    B. Prescription contact lenses can be worn in the plant with safety glasses.

    C. Side shield must be attached to non-prescription and prescription safety glasses. Side shields must fit tightly to the glass frame and close to the wearer face.

    D. Safety goggles may also be worn instead of safety glasses.

3. **Safety goggles** must be worn in all areas where their use has been designated.

    A. Safety glasses **may not** be substituted for safety goggles where the work activity dictates that goggles be worn.

    B. Safety goggles and face shields will be worn if performing work that involves grinding, drilling, liquid chemicals, acids or caustic liquids, or chemical gases or vapors which could result in injury to the eyes.

    C. Shaded filter lenses will also be worn for protection for those working with hazards due to injurious light radiation. Appropriate shade numbers are to be used for various welding operations.

4. **Face Shield**

    A. When face shields are used they must be used in concert with safety glasses or goggles.

    B. Face Shield can be worn as an alternative to goggles when performing any work where flying particles or molten metal is present.

5. **Safety footwear**

    A. Safety toe (ANSI Z41.1-1911 approved) shoes are required to be worn whenever working in areas where there are dangers of foot injuries due to falling or rolling objects, or objects piercing the sole, and where such CES employee's feet are exposed to electrical hazards. There will be a monetary reimbursement from CES Environmental Services, Inc to defray the cost of safety toe footwear. CES Environmental Services, Inc will not however provide reimbursement for shoes that do not meet established standards for safety footwear.
        i. CES Environmental Services, Inc will pay up to $50.00 a year or $100.00 every two (2) years on the proper footwear
        ii. Questions on proper footwear or reimbursement contact the HSE Manager.

    B. For safety reasons, the following types of shoes are not acceptable in the facility or specific job sites: Tennis or jogging shoes with canvas or nylon tops, thongs, sandals, or high heels.

6. **Hearing protection devices** are required in designated areas or for operations involving individual exposure to elevated noise levels. Several types of hearing protection will be provided by CES Environmental Services, Inc to suit any variety of conditions.

7. **Respiratory protection** is required in designated areas or for operating conditions involving individual exposure to high dust levels or potentially harmful vapors.

8. **Clothing**

   A. Shirts without sleeves (including shirts with cut-out sleeves), tank tops, shorts, or open weave mesh shirts will not be worn in operating areas.

   B. Loose fitting clothing that can be caught in the moving parts of machinery will not be worn.

   C. Long pants will be worn when working in the plant.

   D. **People exposed to flames, electrical areas, or potential electrical flash OSHA 29 CFR 1910.269 requires flame-retardant clothing**. If CES or contractors who are subject to this type of exposure, they must wear flame-retardant uniforms and or apron (for non-electrical personnel). Long sleeve shirt will be required and flame-retardant. CES Environmental Services, Inc will supply flame-retardant uniforms for electricians.

   E. CES Environmental Services Operations people do not engage in breaker operations.

Hand protection (Gloves)

   F. CES Environmental Services, Inc CES employees are **required** to use appropriate hand protection when exposed to hazards such as those from skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, and harmful temperature extremes.

   G. Selection of appropriate hand protection shall be based on the evaluation of the characteristics of the work to be performed that are relative to the task, conditions present, duration of use, and the hazards/potential hazards identified.
      i. The HSE Manager will periodic evaluate and determine appropriate hand protection.
      ii. Questions on proper hand protection contact the HSE Manager

Training on proper donning, doffing, maintenance and cleaning is provided in the CES employee training.

Each person is to be responsible for the proper and safe condition of his Personal Protective Equipment. CES employees need to inspect daily their PPE. If any equipment is found to be defective it needs to be properly disposed of immediately and replaced.

No CES employee owned PPE is permitted to be used by CES employees.

GARY P.

Standard Operating Procedure

THINK... USE GOOD JUDGMENT	CES Environmental Services, Inc.	YOUR ATTITUDE COUNTS
Date Issued 04/07/08	DEPARTMENT (S) - Operations - Processing - Maintenance and Field Services	Revised Date 00/00/00
Policy Number 08-047	SOP Title: Odor Management - Sampling Odorous Materials	SOP Description: Describes the procedures for pulling samples of odorous materials on the CES yard

The following procedure should be followed when sampling a load coming in or leaving CES environmental Services yard. The Main Processing Facility Personnel are responsible for alerting whoever will be pulling the samples that the load is odorous so that these procedures will be followed.

1) Trailer should be parked in the wastewater unloading bay.
2) Scrubber unit should be checked and turned on and all valves (except the valve you need opened) should be closed
3) Vent line should be hooked up to scrubber unit and the vent valve moved to the open position.
4) Have sample jar and sampling device ready and open dome lid on trailer. Only open dome lid as much as you need to get the sample of the incoming or outgoing load. Sample should be pulled quickly. If odor is to bad stop the sampling and notify a supervisor
5) When pulling a sample on a product trailer that is going out for sale two samples need to be pulled. By pulling two samples this will prevent us from having to open the dome lid again and any potential for a release.

Name ____________________________ Date ___________________________

Odor Management – Sampling Odorous Materials Training Document Quiz

1. Who is responsible for informing the person who will pull a sample that the load is odorous?

2. When should the Odor Management Procedures be followed?

   a. b. c.

3. For odorous loads, where must the trailer be parked before a sample may be pulled?

4. What should be checked and turned on prior to pulling a sample?

5. All valves (except the valve you will be using) must be

   _________________ at all times.

6. The vent line should be hooked up to the _______________ ____________ and the valve moved to the open position.

7. The dome lid should be open as ___________________ (much, little) as possible; therefore all equipment should be ready and the sample should be pulled as ___________________________ as possible.

8. What should be done if the odor is too bad?

9. If this is a sample product going out for resale, why should you pull two samples?

After this quiz has been checked and reviewed, you may consider yourself trained. I,

_________________________________, am now responsible for this information.

Gary Peterson

From: Kelli Lofton
Sent: Thursday, April 17, 2008 2:58 PM
To: Matt Bowman; Greg Bowman; Marlin Moser; Bo Cumberland; Gary Peterson; Godefroy Gbery; Sam Brown; Miles Root
Subject: SOP change

This has been added to the SOP for Shipping and Receiving – Receiving Loads #54:

> **NOTE: This SOP is part of the Odor Management Policy**. If an obviously odorous load has not been identified as Odorous (according to the profile), the Main Processing Facility Personnel will pull a sample (refer to SOP #47 – Sampling Odorous Loads for procedure) and give it to the **Lab and Quality Assurance Manager** to determine how the material will be processed to mitigate the odor and what surcharges should be applied. If the load cannot be processed in such a way that the odor is sufficiently mitigated, it will be rejected. In either case, the **Lab and Quality Assurance Manager** will contact the appropriate sales rep as per this SOP.

Kelli Lofton
CES Environmental Services, Inc.
4904 Griggs Road
Houston, TX, 77021
713-800-7926 (direct)
713-676-1460 (office)
281-785-0764 (cell)

SOP 14 Receiving Loads

LAB
T-32
8/4/09
CE

Standard Operating Procedure

THINK... USE GOOD JUDGMENT	CES Environmental Services, Inc.	YOUR ATTITUDE COUNTS
Date Issued 12/18/07	DEPARTMENT (S) - Operations - Processing - Maintenance and Field Services - Sales, Finance, and Administration	Revised Date: 1/2/2008
Policy Number 07-014	SOP Title Receiving Loads at CES and Shipping loads from CES - **(Main Processing Facility Laboratory)**	SOP Description This SOP provides a detailed description of the procedures to be followed when either receiving loads at CES or shipping loads from CES. Focus is on activities performed predominantly by the Main Processing Facility Laboratory.

This standard operating procedure must be followed when either receiving loads at CES (e.g. loads of waste, product, and material to be received and treated/managed by CES as well as loads of waste, product, and material to be trans-shipped to another facility) and when shipping loads originating at CES to an outside facility (e.g. loads of waste, product, and material to be shipped to another facility). The SOP focuses on the work to be performed by the **Main Processing Facility Laboratory** as the functions performed by this group act as the nucleus for operations, dictating a significant portion of processing operations. Accordingly, the procedures detailed hereinafter pertain mainly to the "beginning" and the "end" operating procedures for the **Main Processing Facility** and the **Hydrocarbon Processing Facility** but do not cover the operations in the "middle". That is, the SOP details the handling of all sampling, load inventory paperwork, lab sample management, and establishing work management systems for receiving and shipping. However, the SOP does not address the "middle" activities such as tank inventory tracking, truck loading and unloading, treatment and processing procedures, in-plant operations, discharge procedures, tank storage tracking mechanisms, inventory management, etc.

1) RECEIVING LOADS AT CES

The first thing that must be done is that all drivers must sign the **Driver Sign-In Sheet** located on the **Driver Sign-in Clipboard** just outside the **Main Processing Facility Laboratory.**
Next, CES **Drivers** and subcontracted drivers should present all Manifests, Bills of Lading, and associated weight tickets to **Main Processing Facility** to the **Laboratory Technicians** (including Manifests and Bills of Lading destined for other facilities not yet delivered or "in-transit"). **Laboratory Technicians** must immediately write the trailer number at the top of each manifest or bill of lading.

Next, concerning loads in-bound for CES (either to be officially received or trans-shipped), **Main Process Facility** personnel will immediately place the paperwork in the appropriate in-box title either **Un-received Bulk Load Manifests** or **Un-received Drum Load Manifests**. Laboratory Technicians shall review the paperwork to ensure all items have been completed and that all appropriate and necessary paperwork has been provided (all boxes on manifests must be complete, heavy and light weight tickets are required for all product loads).

Note: Manifests and BOLs will stay in these boxes until a sample has been taken, drums/totes inventoried, the loads analyzed and properly documented, and treatment/handling determinations have been made

Note: Manifests or Bills of Lading brought in by CES **Drivers** after hours or when no **Main Processing Facility** personnel are working should be placed in the **Main Processing Facility Laboratory** in the in-box titled **After Hours Manifests and BOLs**

In-transit, non-bulk shipments (drums, totes, cubic yard containers, etc.)

For all loads that will not be received by CES and will be out-bounded to other facilities (using the same paperwork so the job is not complete yet), **Laboratory Technicians** will make copies of Manifests and Bills of Lading and place copies in an in-box in the **Main Processing Facility Laboratory** titled **Outbound "In-transit" Loads – Paperwork Copies**.
Note: For universal wastes being shipped out of state, they shall also staple the copy of the bill of lading to the back of the manifest to keep the documents together

Next, **Drum Processing Technicians** shall contact **Logistics Managers** to determine into which designated outbound trailer numbers the containers shall be re-loaded. They shall next make an entry on the active Drum Processing Work List Form directing the **Drum Processing Leadman** and/or **Drum Processing Technician** to unload the trailer, inventory the non-bulk containers, and re-load the containers onto the properly dedicated CES trailer(s) destined for the appropriate off-site facility.

When the **Drum Processing Leadman** and/or **Drum Processing Technicians** are ready to unload, inventory, and re-load the containers for off-site shipment,

they will remove the copy of the paperwork from the in-box titled **Outbound "In-transit" Loads – Paperwork Copies** and use such copies to inventory the containers for accuracy. This activity will entail unloading the containers in the **Inventory and QC Area** of the **Main Processing Facility**, matching container labels to the manifest or b.o.l. to validate proper count, profile numbers, packaging, etc.
If any discrepancies are discovered, they should be immediately reported to the proper **Customer Service Representative** for resolution (and hence the **Sales Representative** and the customer). If it is discovered that a container is improperly packaged, leaking, or damaged, the container should be properly re-packaged or over-packed and re-labeled. This activity should be reported immediately to the **Laboratory Technicians**. The **Laboratory Technicians** will immediately document such activity in the **Billing Comments** of the job write-up for that specific CES Job Number in the **CES Access Database** and notify the proper **Customer Service Representative** so that the **Sales Representative** and customer can be notified of the additional impending charges.
Note: Loads to be trans-shipped will not have a CES Profile and consequently no fees for such services are specified. In such cases, Laboratory Technicians should assume that the fees to be applied will be those listed in the <u>Disposal Rate Sheet</u> in the **CES Shared Documents** file

Upon completion of the inventory, the copy of the manifest and/or b.o.l. should be placed back in the in-box titled **Outbound "In-transit" Loads – Paperwork Copies** until the containers are actually shipped off-site. **Laboratory Technicians** will next remove the original manifest and/or b.o.l. (and any associated paperwork) from the in-box titled **Un-received Drum Load Manifests** and place the paperwork in the in-box titled **Completed Manifests and B.O.L.s**

Next, **Drum Processing Technicians** and/or **Drum Processing Leadman** will re-load all the containers onto the properly dedicated outbound trailer(s). After the outbound trailer(s) have been re-loaded, they shall sign off on the <u>Drum Processing Work List Form</u> designating that the job has been complete.

Finally, when the containers actually ship off-site, Laboratory Technicians shall purge and discard the appropriate paperwork copies from the in-box titled **Outbound "In-transit" Loads – Paperwork Copies.**

<u>Non-bulk shipments received by CES (drums, totes, cubic yard containers)</u>

After placing the original manifest and/or b.o.l. in the in-box titled **Un-received Drum Load Manifests**, the **Laboratory Technicians** either direct the **Drum Processing Leadman** and/or **Drum Processing Technicians** to unload, QC, and sample the containers (for shipments requiring immediate off-loading) or make an entry on the active <u>Drum Processing Work List Form</u> directing the **Drum Processing Leadman** and/or **Drum Processing Technician** to unload and QC, and sample the containers on the incoming trailer (for shipments that may be handled at a later time).

When the **Drum Processing Leadman** and/or **Drum Processing Technicians** are ready to unload, sample, inventory, and place processing codes on the containers to be received, they shall do the following: remove the original paperwork from the in-box titled **Un-received Drum Load Manifests**, copy this paperwork, replace the original paperwork in the in-box titled **Un-received Drum Load Manifests**.

Next, the **Drum Processing Leadman** and/or **Drum Processing Technicians** shall unload the containers in the **Inventory and QC Area** of the **Main Processing Facility** and match container labels to the manifest or b.o.l. to validate proper count and CES profile numbers. If any discrepancies are discovered, they should be immediately reported to the proper **Customer Service Representative** for resolution.

During this process, they shall also check for improperly packaged, leaky, and/or damaged containers. If it is discovered that a container is improperly packaged, leaking, or damaged, the container should be properly re-packaged or over-packed and re-labeled. This activity should be reported immediately to the **Laboratory Technicians**. The **Laboratory Technicians** will immediately document such activity in the **Billing Comments** of the job write-up for that specific CES Job Number in the **CES Access Database** and notify the proper **Customer Service Representative** so that the customer can be notified of the additional impending charges.

Note: If not specified in the Process Facility Information of the CES Waste Profile or CES Material Profile (in the **CES Access Database**, the charges to be applied shall default to those listed in the Disposal Rate Sheet in the **CES Shared Documents** file

Upon completion of the inventory and inspection, the containers are now ready to be sampled. The **Drum Processing Leadman** and/or **Drum Processing Technicians** should open each drum. A representative, composite sample should be pulled from containers representing for each individual inbound profile. This is accomplished by using a 5-gallon bucket to store equal amounts from each container (from any given profile group). After the composite sample has been placed in the bucket, it should be mixed thoroughly and a small amount transferred into a sample container. The next incoming profile container group should be sampled in the exact same manner. Each sample jar should now be labeled to include the proper profile number. Sample labels are located just outside the **Main Processing Facility Laboratory**.

Next, the samples must be submitted to the **Laboratory Technicians** to validate that the samples are representative of the material as profiled by the generator.

If any discrepancies are discovered, **Laboratory Technicians** must immediately contact the appropriate **Customer Service Representative** (and hence the **Sales Representative** and the customer) to resolve the problem.

Certain loads will arrive at CES and cannot be officially received for some of the following reasons: the load does not meet specifications (as spelled out in the CES Waste Profile or CES Material Profile), the load requires further analysis and/or QC by **Main Processing Facility** personnel to determine if CES can legally and technically or physically treat the load, the load must be held for a period of time and may be processed at a later date, etc.. In such cases, the original manifest and/or bill of lading and weight tickets will be temporarily placed in an in-box in the **Main Processing Facility Laboratory** titled **Received Loads in Processing (Copies Only) and Un-Received Loads Pending Additional Analysis (Originals).**
If the waste, product, and/or material is non-conforming but can be legally and technically processed by CES, either a completely new CES Waste Profile or CES Material Profile must be completed or an amendment must be made to the original. Such documents must be immediately completed and submitted by the generator and approved by the CES **HSE Manager** prior to the official acceptance of the waste (see **CES Standard Operating Procedures Manual**). Once the issue is resolved, the load may be received as above detailed.

Otherwise, all non-conforming waste must be immediately returned to the generator. For any portion of non-conforming wastes that must be rejected, the profile and/or b.o.l. must be corrected (both by the generator/shipper and the CES **Laboratory Technicians**). For entire loads that must be rejected, **Laboratory Technicians** must only note the issue in the proper location on the manifest and/or b.o.l.

For any surcharges that must be imposed (based on reviewing the sample as compared to the pricing information listed in the Process Facility Information for the CES Waste Profile in the **CES Access Database**), **Laboratory Technicians** shall complete a CES Inbound Load Report in order to document the appropriate surcharges. If no surcharges are designated, **Laboratory Technicians** shall use default pricing specified in the CES General Disposal Rate Sheet located in the **CES Shared Documents.**

If the load arrives and requires fees for which the pricing structure established is either not applicable to or appropriate for the load (as listed in either the Process Facility Information or the default pricing listed in the **CES Shared Documents**) the Laboratory Technician shall immediately contact the proper **Customer Service Representative** and hence the **Sales Representative** and the customer to decide upon a fair rate. If a fair rate is determined, the **Laboratory Technician** must document the pricing for that particular load in the Billing Comments of the **CES Access Database** (for that particular job number).

For all non-bulk product and/or material loads, a CES Inbound Load Report must be completed. **Laboratory Technicians** shall use the information contained in the Process Facility Information of the CES Material Profile (in the **CES Access Database**) to determine the appropriate tests and analysis to perform and report. Any product/material that deviates from the information listed herein should be reported immediately to the **Customer Service Representative** (and hence the **Sales Representative** and the customer).

Upon validation and analysis of the container contents, the load may now be officially accepted by CES. **Laboratory Technicians** must now do the following:

- sign the manifest and/or b.o.l. and remove the designated facility copy (placing it in the in-box titled **Designated Facility Copies (Manifests, B.O.L.s, etc.)**
- for loads received by outside transporters, remove the transporter's copy of the manifest and/or b.o.l. and place it in the in-box titled Outside Driver Manifests
- sign the CES Inbound Load Report (if applicable) and place the pink copy in the in-box titled **Completed Inbound/Outbound Load Reports (Facility Copies Only). Laboratory Technicians** will file this copy at the beginning of each day (for prior day's work) in the office of the **Director of Processing** in a binder titled **Archived In-bound/Outbound Load Reports (Pink Facility Copies)**
- staple the remaining copies of the CES Inbound Load Report to the back of the remaining copies of the manifest and/or b.o.l. and place the paperwork bundle in the in-box titled **Completed Manifests and B.O.L.s**

It is now up to the **Drum Processing Leadman** and/or **Drum Processing Technicians** to write a process code on each container and stage **the container in the appropriate area on the processing side of the Main Processing Facility** (see CES **Standard Operating Procedures Manual**).

Bulk shipments received by CES (Wastes, Products, and Materials)

After placing the original manifest and/or b.o.l. in the in-box titled **Un-received Bulk Load Manifests**, the **Laboratory Technicians** shall either direct the **Drum Processing Leadman** and/or **Drum Processing Technicians** to validate volumes and sample the bulk container (for shipments requiring immediate off-loading) or make an immediate entry on the appropriate Special Processing Work List Form, Wastewater Processing Worklist Form, or Hydrocarbon Processing Worklist Form directing such appropriate personnel to validate volumes, sample the bulk container, and perform the necessary work, handling, or processing as specified in the Process Facility Information in the profile (for shipments that may be handled at a later time). For any such shipments that will be handled at a later time, **Laboratory Technicians** shall leave the manifest and/or b.o.l. in the in-box titled

Un-received Bulk Load Manifests until the appropriate CES personnel can properly validate volumes and sample the bulk container (see below).

Next, the **Drum Processing Leadman** and/or **Drum Processing Technicians** (or other CES personnel as above detailed) shall validate container volumes (compared to that on the manifest or b.o.l.) and pull a composite sample on the bulk container (top to bottom). If any volume discrepancies are discovered, they should be immediately reported to the proper **Customer Service Representative** for resolution.

Next, the sample container must be properly labeled include the proper profile number. Sample labels are located just outside the **Main Processing Facility Laboratory**.

Next, the samples must be submitted to the **Laboratory Technicians** to test/analyze, and validate that the samples are representative of the material as profiled by the generator.
If any discrepancies are discovered, **Laboratory Technicians** must immediately contact the appropriate **Customer Service Representative** to resolve the problem.

Certain loads will arrive at CES and cannot be officially received for some of the following reasons: the load does not meet specifications (as spelled out in the CES profile), the load requires further analysis and/or QC by **Main Processing Facility** personnel to determine if CES can legally and technically or physically treat the load, the load must be held for a period of time and may be processed at a later date, etc.. In such cases, the original manifest and/or bill of lading and weight tickets will be temporarily placed in an in-box in the **Main Processing Facility Laboratory** titled **Received Loads in Processing (Copies Only) and Un-Received Loads Pending Additional Analysis (Originals). Laboratory Technicians** must immediately notify the **Logistics Managers** of such loads so that the bulk containers are not dispatched (until they can be unloaded).
If the waste, product, and/or material is non-conforming but can be legally and technically processed by CES, a new profile and/or profile amendment must be submitted by the generator and approved by the CES **HSE Manager** prior to the official acceptance of the waste (see **CES Standard Operating Procedures Manual**). Once the issue is resolved, the load may be received as above detailed.

Otherwise, all non-conforming waste must be immediately returned to the generator. For bulk loads that must be rejected, **Laboratory Technicians** must only note the issue/discrepancy in the proper location on the manifest and/or b.o.l.

For any surcharges that must be imposed (based on reviewing the sample as compared to the pricing information listed in the Process Facility Information for the CES Waste Profile in the **CES Access Database**), **Laboratory Technicians** shall complete a CES Inbound Load Report in order to document the appropriate surcharges. If no surcharges are designated, **Laboratory Technicians** shall use default pricing specified in the CES General Disposal Rate Sheet located in the **CES Shared Documents**.

If the load arrives and requires fees for which the pricing structure established is either not applicable to or appropriate for the load (as listed in either the Process Facility Information or the default pricing listed in the **CES Shared Documents**) the Laboratory Technician shall immediately contact the proper **Customer Service Representative** and hence the **Sales Representative** and the customer to decide upon a fair rate. If a fair rate is determined, the **Laboratory Technician** must document the pricing for that particular load in the Billing Comments of the **CES Access Database** (for that particular job number).

For all bulk product and/or material loads, a CES Inbound Load Report must be completed. **Laboratory Technicians** shall use the information contained in the Process Facility Information of the CES Material Profile (in the **CES Access Database**) to determine the appropriate tests and analysis to perform and report.

For all bulk wastewater loads, a CES Inbound Wastewater Load Report must be completed and placed in the in-box titled **Completed Inbound Wastewater Load Reports**. This information shall be entered on a daily basis (by the **Laboratory Technicians**) in the **CES Shared Documents** in the folder titled **Daily Wastewater Logs**. **Laboratory Technicians** shall file these forms at the beginning of each day (for the previous day's work) in the office of the **Director of Processing** in a binder titled **Archived CES Inbound Wastewater Load Reports.**

Upon validation of the container contents, the load may now be officially accepted by CES. If a bulk load has been tested and may be officially received, **Laboratory Technicians** will elect to do one of the following:

a) Immediately direct the appropriate unloading/treatment/handling of the waste, product, or material (as determined based on the sample and analytical and as detailed in the Process Facility Information). In such cases, **Laboratory Technicians** must immediately do the following:
    - sign the manifest and/or b.o.l. and remove the designated facility copy (placing it in the in-box titled **Designated Facility Copies (Manifests, B.O.L.s, etc.)**
    - for loads received by outside transporters, remove the transporter's copy of the manifest and/or b.o.l. and place it in the in-box titled **Outside Driver Manifests**
    - sign the CES Inbound Load Report (if applicable) and place the pink copy in the in-box titled **Completed Inbound/Outbound Load Reports (Facility Copies Only)**
    - staple the remaining copies of the CES Inbound Load Report to the back of the remaining copies of the manifest and/or b.o.l. and place the

paperwork bundle in the in-box titled **Completed Manifests and B.O.L.s**

b) Officially receive the load but direct the trailer to be handled at a later time. Such loads will typically be relegated to loads that do not require quick unloading (so the bulk container can be dispatched the following day) and will also require special or extensive treatment/handling/management. In such cases, the **Laboratory Technician** should do the following:
   - o sign the manifest and/or b.o.l. and remove the designated facility copy (placing it in the in-box titled **Designated Facility Copies (Manifests, B.O.L.s, etc.)**
   - o sign the CES Inbound Load Report (if applicable) and place the pink copy in the in-box titled **Completed Inbound/Outbound Load Reports (Facility Copies Only)**
   - o staple the remaining copies of the CES Inbound Load Report to the back of the remaining copies of the manifest and/or b.o.l. and place the paperwork bundle in the in-box titled **Completed Manifests and B.O.L.s**
   - o Make an entry on the appropriate Wastewater Processing Worklist Form, Hydrocarbon Processing Worklist Form, or Special Processing Worklist Form directing the proper unloading/treatment/handling of the waste, product, or material (as determined by the sampling and analytical work performed and detailed in the Process Facility Information).
   - o Make a copy of the manifest or b.o.l. and place it in the in-box titled **Received Loads in Processing (Copies Only) and Un-received Loads Pending Additional Analysis (Originals)**
   - o Contact **Logistics Managers** immediately so that the bulk container is not scheduled for dispatch (until it can be unloaded).

When the loads are ready to be managed, the designated CES personnel shall perform the specified work (see **CES Standard Operating Procedures Manual**). Once complete, the appropriate CES personnel should sign off on the proper work list form indicating that the work has been complete. The **Laboratory Manager** should check this work list form to validate completion of the work. Once the validation has been made, the **Laboratory Technician** shall remove and discard the copy of the paperwork from the in-box titled **Received Loads in Processing (Copies Only) and Un-received Loads Pending Additional Analysis (Originals).**

c) For certain loads that arrive at CES and cannot be officially received for some of the following reasons: the load does not meet specifications (as spelled out in the CES Waste Profile or CES Material Profile), the load requires further analysis and/or QC by **Main Processing Facility** personnel to determine if CES can legally and technically or physically treat the load, the load must be held for a period of time and may be processed at a later date, etc.. In such cases, the **Laboratory Manager** should do the following:
   - o Make an entry on the appropriate Wastewater Processing Worklist Form, Hydrocarbon Processing Worklist Form, or Special Processing

Worklist Form directing the proper unloading/treatment/handling management of the waste, product, or material (as determined by the sampling and analytical work performed and detailed in the Process Facility Information).

- Place the original manifest or b.o.l. in the in-box titled **Received Loads in Processing (Copies Only) and Un-received Loads Pending Additional Analysis (Originals)**
- Contact **Logistics Managers** immediately so that the bulk container is not scheduled for dispatch (until it can be unloaded).

If the waste, product, and/or material is non-conforming but can be legally and technically processed by CES, either a completely new CES Waste Profile or CES Material Profile must be completed or an amendment must be made to the original. Such documents must be immediately completed and submitted by the generator and approved by the CES **HSE Manager** prior to the official acceptance of the waste (see **CES Standard Operating Procedures Manual**). Once the issue is resolved, the load may be received as above detailed.

d) Officially receive the load but direct that it be parked On-the-Line. Such loads will be relegated to loads which can be handled with standard protocols and require unloading before the following day to ensure the trailers are ready to be dispatched the following day. In such cases, **Laboratory Technicians** should do the following:

- sign the manifest and/or b.o.l. and remove the designated facility copy (placing it in the in-box titled **Designated Facility Copies (Manifests, B.O.L.s, etc.)**
- sign the CES Inbound Load Report (if applicable) and place the pink copy in the in-box titled **Completed Inbound/Outbound Load Reports (Facility Copies Only)**
- staple the remaining copies of the CES Inbound Load Report to the back of the remaining copies of the manifest and/or b.o.l. and place the paperwork bundle in the in-box titled **Received Loads On-the-Line and Ready to Unload (Originals)**
- Make an entry on the appropriate Wastewater Processing Worklist Form, Hydrocarbon Processing Worklist Form, or Special Processing Worklist Form directing the proper unloading/treatment/handling of the waste, product, or material (as determined by the sampling and analytical work performed and detailed in the Process Facility Information).

When the loads are ready to be managed, the designated CES personnel shall perform the specified work (see **CES Standard Operating Procedures Manual**). Once complete, the designated CES personnel completing the work should sign the appropriate worklist form designating that the work has been completed. The **Laboratory Technician** shall review the work lists to validate completion of the work. Upon vaolidation of completion, the **Laboratory Technician** will remove the original paperwork from the in-box titled **Received Loads On-the-Line and Ready to Unload**

(Originals) and placed in the in-box titled **Completed Manifests and B.O.L.s.**

e) Officially receive the load with the understanding that the load must be shipped out, un-processed (as-is), to an alternate facility. Please note that sometimes such loads may be offloaded to a separate, but isolated storage container. In such cases, **Laboratory Technicians** should do the following:
   - o sign the manifest and/or b.o.l. and remove the designated facility copy (placing it in the in-box titled **Designated Facility Copies (Manifests, B.O.L.s, etc.)**
   - o sign the <u>CES Inbound Load Report</u> (if applicable) and place the pink copy in the in-box titled **Completed Inbound/Outbound Load Reports (Facility Copies Only)**
   - o staple the remaining copies of the <u>CES Inbound Load Report</u> to the back of the remaining copies of the manifest and/or b.o.l. and place the paperwork bundle in the in-box titled **Completed Manifests and B.O.L.s**
   - o Make a copy of the manifest or b.o.l.. If the load will be transloaded into another bulk container or on-stie storage tank, the Laboratory Technician should make such notes on the copy of the manifest or b.o.l.. Next, this copy should be place it in the in-box titled **Received Waste Loads – Ready for Re-Shipment Out (Copies Only).**

   Laboratory Technicians should contact the appropriate **Customer Service Representative** to ensure that the load is re-scheduled for shipment. The **Laboratory Technician** must inform the **Customer Service Representative** of the trailer, container, or tank number (regardless of weather or not the load was unloaded to a storage tank or alternate bulk container). Once the load has been shipped off-site, the **Laboratory Managers** should remove and purge the copy from the in-box titled **Received Waste Loads – Ready for Re-Shipment Out (Copies Only)**

2) DAILY VERIFICATION OF UNLOADING ACTIVITIES AT CES

Prior to the end of each day, the **Main Processing Facility Supervisor** and/or the **Laboratory Technicians** must check with the **Logistics Managers** to determine which loads that are still pending receipt. The Main Processing Facility Supervisor shall ensure that if the load must be unloaded that evening (to ensure proper dispatch the following day) that a Laboratory Technicians stays until all such loads have been received. If this is not possible, Logistics must be immediately notified so they can make alternate arrangements.

3) SHIPMENTS OF LOADS OF WASTE & PRODUCTS FROM CES

For all shipments (both wastes, products, materials, etc.), the appropriate CES personnel (see **CES Standard Operating Procedures Manual**) shall pull a composite sample and label the sample (noting the date, container number, and CES profile approval number (from the CES Waste Profile or the CES Material Profile).

Note: for bulk waste container shipments (solids and sludges), the sampler shall collect small samples from several portions of the container, place them in a 5-gallon bucket, mix the bucket, and put the now composited sample into the sample collection bottle

Note: For drum shipments, the sampler shall pull a composite of all drums. This is accomplished by using a 5-gallon bucket to store equal amounts from each container (from any given profile group). After the composite sample has been placed in the bucket, it should be mixed thoroughly and a small amount transferred into a sample container. The next incoming container CES Profile group should be sampled in the exact same manner. Each sample jar should now be labeled to include the proper CES Profile approval number

All samples shall next be submitted to the **Laboratory Technician** for analysis.

Laboratory Technicians shall first review the information listed in the Processs Facility Information of the CES Waste Profile and/or CES Material Profile in order to determine what analysis to perform. For all wastes, products, and materials shipped from CES, **Main Processing Facility** personnel will complete an Outbound Load Report in accordance with Process Facility Information listed in the profile in the **CES Access Database** (see **CES Standard Operating Procedures Manual**). Once complete, this form and all copies should be placed in the **Main Processing Facility Laboratory** in the in-box titled **Completed Outbound Load Reports (Ready to be Shipped).** The form should remain in this in-box until the time of shipment. Upon shipment, the **Laboratory Managers** shall pull the completed Outbound Load Report from this in-box, detach the pink copy and place it in the in-box titled **Completed Inbound/Outbound Load Reports (Facility Copies Only),** use a paperclip to affix the remaining copies of this report to the back of the original manifest or b.o.l.

Concerning loads that are picked up at CES (waste, product, or material) by outside transporters, certain additional procedures apply. For a review of such procedures, refer to the **CES Standard Operating Procedures Manual.**

4) THE SAMPLE MANAGEMENT SYSTEM

INBOUND LOAD SAMPLES:

When a load arrives at CES, the driver will present the manifest or BOL to the main processing facility laboratory. The Main Processing Facility lab personnel will check the profile number and fill out a sample label that will be given to the MPF personnel who will be pulling the sample.

Once the sample is pulled, it will be placed on the shelf labeled "Unreceived Incoming Samples" until the sample has been QC'd according to the process facility information. It is important that the sample remain on this shelf until all testing has been completed.

After the sample has been tested, it will be moved to the shelf labeled "Incoming Samples – QC Completed" located inside the MPF lab. Every afternoon before 4:00pm the MPF Lab personnel will move these samples to the closets just outside the lab. (See Inbound Sample Storage below).

> Note: For shipments where the inbound product and the outbound product are exactly the same (no processing), we will still pull two separate samples and complete separate inbound and outbound load reports since the customer and description will be different.

The MPF personnel will fill out an Inbound Load report for all products and for all waste loads that do not meet specs (except caustic loads which will be treated as product loads requiring inbound load reports each time). MPF personnel will record the results of all testing in the appropriate notebook:

- Caustic notebook for caustic loads
- Oil Material Testing notebook for oil facility loads (in and outbound)
- Incoming Tank Trucks Water notebook for incoming wastewater loads
- Special Products notebook for other products

The pink copy of the Inbound Load Report will be placed in the tray labeled "Completed Inbound/Outbound Load Reports". The remaining copies will be attached to the manifest or Bill of Lading and placed in the tray labeled "Completed CES Manifests and BOL's".

Every morning the pink copies will be filed by the Processing Manager in his desk drawer located in the R&D Lab. After 90 days they will be destroyed.

INBOUND SAMPLE STORAGE:

There are four closets outside the lab to be used for inbound sample storage and they are labeled "Inbound Sample Retains Week One" all the way through "Week Four". Samples pulled from loads arriving in the same week will be stored in the same closet on shelves labeled "Week ____ Inbound Samples". Inbound samples are retained for four weeks and therefore will remain in that closet for four weeks. Every Monday begins a new week and samples from new inbound loads will be stored together in the next closet in line. Caustic samples will be stored on the very bottom shelves.

Every Saturday, the MPF personnel will empty and discard samples that are held in the closet that will be used the following week. The samples will be dumped into a drum labeled "Discarded Lab Samples" and located just outside the MPF lab. When the drum gets full it will be disposed of correctly by MPF personnel.

INBOUND LOADS THAT REQUIRE MORE ANALYSIS OR PROCESSING:

For any inbound loads that require more analysis or processing, the sample will be placed on the shelf labeled "Products on the Line" on the side labeled "More Analysis or Processing Required". The sample will remain here until the analysis has been completed or the load has processed. After the required event has occurred, the sample will be placed on the appropriate shelf (see Inbound Sample Storage above).

OUTSIDE TESTING OF INBOUND LOADS:

When outside testing is required for inbound loads, the sample must be logged and SOP #33 for Sample Receipt, Evaluation and Shipping should be followed.

OUTBOUND LOAD SAMPLES:

Anytime a trailer is loaded with product or waste to ship from CES, an outbound sample will be pulled. It is the responsibility of the MPF personnel who completes the loading of the trailer to be sure the sample is pulled. The MPF personnel will take the sample to the MPF lab, label the sample, and place it on the shelf labeled "Outbound Samples – Not QC'd".

> *Note: If an inbound product trailer does not need any processing and the same trailer will ship the exact same product outbound, the inbound sample and outbound sample may be pulled at the same time but the procedures for both must be followed.

The MPF Lab personnel will use process facility information by product/profile number to perform tests on outbound samples and complete the Outbound Load Report as much as possible. MPF personnel will record the results of all testing in the appropriate notebook:

Caustic notebook for caustic loads
Oil Material Testing notebook for oil facility loads (in and outbound)
Special Products notebook for other products

All outbound samples will be placed on the shelf labeled "Products on the Line" until the load has shipped. Once the loads ships, the samples will be moved to the storage closet labeled "Outbound Samples" where the sample will be retained for 90 days.

All copies of the Outbound Load Report will be placed in the tray labeled "Completed Outbound Load Reports" (even if not complete).

Once a product load has been scheduled to ship out on a BOL, the MPF Lab personnel will verify that all required testing has been completed based on customer requirements and then complete the Outbound Load Report. For profiles that have "refer to shared drive" for specific customer information, MPF personnel should go to the folder "Analytical Testing and Special Handling (by Profile Number)" on the shared drive in the Main Processing Facility and Lab folder. Under each profile number, the specific requirements for each customer should be listed.

Once the Outbound Load Report has been completed, the yellow copy will be attached to the golden copy of the BOL or Manifest and put into the tray labeled "Completed CES Manifests and BOL's"; the gold copy and the white copy will be given to the driver to take to the customer; the pink copy will be placed in the tray labeled "Completed Inbound/Outbound Load Reports". Every morning the pink copies will be filed by the MPF personnel in the filing cabinet located in the MPF lab. They will be filed by month and destroyed after 90 days.

The Main Processing Facility Lab Personnel and the Product Sales Manager will update and check the CES Product Management spreadsheet located in the Sales folder on the shared drive as required by SOP #34 (Management of Products) to keep up with loads coming in and going out. Thus, any additional testing required for specific customers may be performed in a timely manner. It is important to avoid situations where drivers are waiting for sample evaluation.

The outbound sample will be stored the closet labeled "Outbound Samples" and will be retained for a period of 90 days. Once a month the Outbound Samples closet will be inspected and all samples over 90 days will be discarded.

Samples to be discarded will be dumped into the drum labeled "Discarded Lab Samples" located just outside the MPF lab.

WASTEWATER SAMPLES:

Incoming wastewater loads (from customers) will be sampled immediately as we may not accept the load. If the load meets requirements according to process facility information, the sample will be discarded properly by main processing facility personnel. However, if the load will be rejected or if a surcharge needs to be added, the sample will be retained as other incoming loads (see Inbound Sample Storage above).

TREATED WASTEWATER SAMPLES:

After wastewater loads have been treated, the wastewater technician will pull a sample of the treated water and bring it to the MPF to be placed on the shelf labeled "Discharge Compliance/Treated Wastewater Samples". The results of the testing will recorded in the Wastewater Plant Tank testing notebook. After testing of the sample is completed, the sample will be dumped into the drum labeled "Lab Samples to be Discarded" and the empty bottles will be properly discarded by MPF personnel.

OPERATIONAL TREATABILITY SAMPLES from CES PLANT TANKS or TRAILERS:

Samples that are pulled from a CES plant tank or trailer for treatability purposes (not to be sent to a customer or for a sample retain) will be placed on the shelf labeled "Plant Tank & Trailer Treatability or Analysis Samples". Once treatability has been determined, the sample will be discarded in the drum labeled "Discarded Lab Samples" located just outside the MPF lab.

NASH

LAB
T-32
8/14/09
CW

NASH Chemistry

"NaOH can be used in a packed tower to scrub the H2S. If your plant is near a paper mill, they use lots of NaHS, and may be able to purchase your scrubber effluent"

The above statement is true. However, i have excess NaOH if i use the above process. Is there any other process for the production of NaHS? using NaOH and H2S? where is it done and how is it done?

Caustic scrubbers are widely used in petroleum refineries to remove hydrogen sulfide, mercaptans, phenols and other acidic compounds from various streams. When caustic is used to scrub liquid propane to remove H_2S, the intermediate reactions are:

$2NaOH + H_2S ==> Na_2S + 2H_2O$
$Na_2S + H_2S ==> 2NaSH$

Summing the above two reactions, the overall reaction is:

$NaOH + H_2S ==> NaSH + H_2O$

The spent caustic from such scrubbers has indeed been sold to paper mills by some refineries.

If the spent caustic from scrubbing liquid propane contains any sodium mercaptide, that makes the spent caustic difficult to sell.

The spent caustic, from scrubbing naphtha (or jet fuel or light kerosene) in refineries, will very probably contain some sodium phenolate, sodium cresolate and/or some sodium naphthenate in addition to NaSH. Such spent caustic is very difficult to sell or dispose of.

White Liquor Chemistry

The primary compounds in white liquor are NaOH and NaSH. NaSH is produced when Na_2S in the smelt from the recovery boiler is mixed with water in the smelt-dissolving tank. The chemical equation is:

$Na_2S + H_2O \longrightarrow NaSH + NaOH$

This production of caustic is reflected in the definition of white liquor "Effective Alkali" (NaOH + ½ Na_2S). Na_2SO_4 added to black liquor is reduced in the recovery boiler to Na_2S and then ultimately hydrolyzed to form NaSH + NaOH. One mole of NaOH is produced from one mole of saltcake.

Unfortunately adding more saltcake to the black liquor will increase the sulphidity of the white liquor, which is unacceptable. Adding caustic to the white liquor to control sulphidity will eliminate the problem but excess white liquor will be produced. This excess white liquor could be used in the bleach plant extraction stage to displace purchased caustic but it is well documented that the NaSH in white liquor will negatively impact the bleaching performance of the extraction stage. The NaSH can be oxidized, but should it be oxidized to thiosulphate ($Na_2S_2O_3$) or sulphate (Na_2SO_4)?

When white liquor is oxidized to thiosulphate, OWL(T), the following equation applies:

$2NaSH + 2\,O_2 \rightarrow Na_2S_2O_3 + H_2O$

whereas, the equation:

$NaSH + NaOH + 2O_2 \rightarrow Na_2SO_4 + H_2O$

applies when the liquor is oxidized to sulphate, OWL(S)

From the above it can be seen that oxidizing the liquor to sulphate consumes caustic and ultimately brings us back to where we started. Clearly then, to take advantage of the caustic produced from excess saltcake, the NaSH in the white liquor should only be oxidized to thiosulphate.

Examples of the difference in caustic concentration between White Liquor (WL), OWL(T) and OWL(S) are presented in Table I. The data on WL(1) and WL(2) is from the paper entitled: Sulfur Purge: Fully Oxidizing White Liquor For Use In the Bleach Plant Purges Excess Sulfur And Utilizes NaOH [1] and the data on WL(3) is from work conducted at Air Products and Chemicals Inc.

Values in g/l Na_2O

	WL (1)	Q-OWL	WL(2)	Q-OWL	WL(3)	OWL(T)	OWL(S)
Na_2S	30.80	0.00	34.80	0.00	33.67	0.00	0.00
Na_2SO_3	1.50	1.70	1.13	0.56	1.23	4.58	1.02
$Na_2S_2O_3$	1.61	2.81	1.42	1.05	0.66	10.15	2.57
Na_2SO_4	3.54	30.50	0.84	36.10	4.41	6.72	37.13
NaOH	58.90	62.00	73.00	78.10	72.39	90.29	74.48
Predicted NaOH		60.82		72.77		88.1	74.95
E.A.	**74.30**	**62.00**	**90.40**	**78.10**	**89.23**	**90.29**	**74.48**
A..A.	89.70	62.00	107.80	78.10	106.06	90.29	74.48

Table 1. Typical white liquor analysis for W.L., OWL(T) and OWL(S)

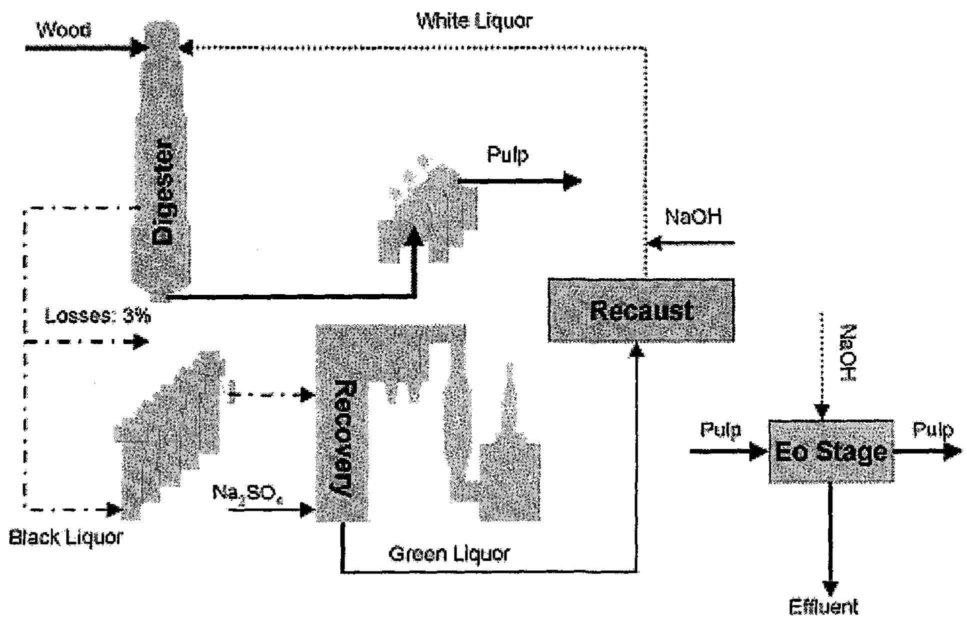
The Q-OWL liquors were oxidized primarily to sulphate. In both Q-OWL cases the E.A., which is the true measure of white liquor NaOH concentration, was reduced by 17 and 14% respectively. In the case of WL(3), where the liquor is oxidized to thiosulphate, the E.A. remains constant at approximately 90g/l. When this same liquor is oxidized to sulphate OWL(S) the E.A. drops by 17%. These data demonstrates that NaOH produced from the hydrolysis of Na2S is retained if the liquor is oxidized to thiosulphate and lost if the liquor is oxidized to sulphate.

Bleaching Studies

A review of studies on the suitability of OWL(T) in bleaching was presented in the paper entitled: Using White Liquor Oxidized to Thiosulphate in the Bleach Plant can Reduce Caustic Purchases by 20% [2]. It was concluded that OWL(T) is suitable for an E, and Eo stage or an oxygen bleaching stage (i.e., full oxygen stage after the first acid stage). The suitability of OWL(T) as an alkali source in Eop was inconclusive. In a further paper [3] it was found that synthetic oxidized white liquor, where 36% of the sodium sulphide was converted to thiosulphate (i.e., 64% to sulphate), was as effective as NaOH in an Eop stage. In the same paper, the author investigated the rate of H_2O_2 decomposition in commercially oxidized white liquor. The decomposition was significant. The author attributed this to the presence of "residual sulphide". Therefore in a commercial situation it will be important to ensure all of the Na_2S is converted to thiosulphate. The author also found that the presence of transition metals in commercial "soda" liquors had a pronounced effect on hydrogen peroxide decomposition and that the addition of magnesium sulfate into the liquor substantially reduced the rate of decomposition.

MASS BALANCES

Mass balances were conducted using the WinGEMS simulation program. Figure 1 is a simplified schematic of the base case. The production rate was set at 1000 odmt/d (bleached). The chloride concentration in the wood was set at 150 ppm (on a dry basis) and the potassium concentration was set at 600 ppm. The chloride concentration of the makeup caustic was 200 ppm.



CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Sodium Carbonate by ABC Titration

CES-LM-11

Scope

The following procedure may be used to determine carbonates in sulfidic caustic solutions. Barium chloride is first added to the solution to tie up the carbonate in the form of barium carbonate. This allows the sulfides to be titrated without interference. The sample is then titrated to pH 8.3. Formaldehyde is then added to react with the sodium hydrosulfide, releasing an equivalent amount of caustic and raising the pH of the solution. The sample is re-titrated to pH 8.3. Finally, the sample is titrated to pH 4.0. With this data, calculations for carbonate may be made. Also, the total alkalinity, expressed as NaOH, may also be calculated.

Equipment

pH meter and probe
Balance
Pipettor and pipettes
Beaker, 250 mL
Stir bar
Stirring motor
Burette and support stand

Reagents

10 wt% $BaCl_2$ solution
Formaldehyde, approximately 37%
Deionized water
0.1 N HCl

Procedure (written for manual titration)

1. Accurately weigh an appropriate sample of the caustic solution to be analyzed; usually 0.3 gram is sufficient for a NaSH product sample. Record the sample weight to 3 decimals.
2. Add a stir bar to the beaker.
3. Dilute with approximately 100mL deionized water.
4. Rinse electrode with deionized water and then place sample on stir plate and begin stirring with electrode immersed in solution.
5. Add 10 mL of 10% barium chloride solution.
6. Titrate with the 0.1 N HCl to a pH reading of 8.3 and record this volume as volume "A". Make sure that the sample is not mixed excessively, which will introduce air into the sample. The sample will pick up carbon dioxide from the air, which will add to the carbonate content of the sample, resulting in an incorrect high value.
7. Without re-zeroing your burette, add approximately 5 mL of 40% formaldehyde. Your pH will increase. Re-titrate to pH of 8.3 and record this new volume as "B". An indicator such as phenolphthalein may also be used in place of a pH probe.
8. Finally, without re zeroing your burette, titrate to a pH of 4.0 and record this volume as "C".

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Calculations

The wt% concentration of **carbonate, calculated as sodium,** is calculated from the formula:

{Normality of HCl x Volume HCl (C-B) x 2.3/}/Sample Size = wt% as Sodium.

Where the normality in this test is 0.1 and the MEW (milliequivalent weight) for Na is 0.023.

The **total alkalinity, expressed as NaOH,** is calculated from the formula:

{Normality of HCl x Volume of HCl (C) x 4.0}/Sample Size = wt% as NaOH

Safety

Caustic solutions may burn the skin. Protective gloves are recommended.

Approved 11-26-08 by MJR

NaHS and Na_2S Calculation Table		
	Use For	Use For
	Sulfidity 101-200	Sulfidity 0-100
Total Alkalinity, as NaOH, wt%	17.0	17.0
Na, wt%, Calculated	9.77	9.77
Na, wt%, from carbonate	1.87	1.87
Na, wt%, from sulfides	7.90	7.90
Sulfide, as S, wt%	9.67	9.67
Sulfidity, Calculated	176	176
% Spent	88	88
NaHS, wt%, Calculated	14.6	0
Na2S, wt%, Calculated	3.2	23.6
NaHS + Na2S wt%, Total	17.8	23.6

NaHS and Na_2S Calculation Table

	Use For Sulfidity 101-200	Use For Sulfidity 0-100
NaOH, wt%	17.9	17.9
Na, wt%, Calculated	10.29	10.29
Sulfide, as S, wt%	4.00	4.00
Sulfidity, Calculated	56	56
NaHS, wt%, Calculated	-11.0	0
Na_2S, wt%, Calculated	25.1	9.8

ABC Test

A $BaCl_2$ 8.3

B Formaldehyde

↑ 8.3

C

~~Na2O~~ Na_2O

H_2S

CO_2

Gary Peterson

From: Gary Peterson
Sent: Monday, September 29, 2008 6:02 PM
To: Kim Harmon; Sam Brown; Godefroy Gbery; Miles Root; Ryan Thomas
Cc: Matt Moser; Joe Camp; Marlin Moser
Subject: RE: Outbound reports; Ammoniated sulfidic caustic
Attachments: Targa Ammoniated Sulfidic Caustic Data Sheet, 9-29-2008.xls

Kim,

The attached data sheet is an average of 6 Targa loads received in July. I will have Godfrey use the average data to do an outbound report for job numbers 69299 and 71290. For the time being I will leave the gallons without data. Let me know what gallons you want inputted.

Thanks.

From: Kim Harmon
Sent: Monday, September 29, 2008 4:59 PM
To: Gary Peterson; Sam Brown; Godefroy Gbery; Miles Root; Ryan Thomas
Cc: Matt Moser; Joe Camp; Marlin Moser
Subject: RE: Outbound reports; Ammoniated sulfidic caustic

Awesome! Thanks Gary

From: Gary Peterson
Sent: Monday, September 29, 2008 4:58 PM
To: Kim Harmon; Sam Brown; Godefroy Gbery; Miles Root; Ryan Thomas
Cc: Matt Moser; Joe Camp; Marlin Moser
Subject: RE: Outbound reports; Ammoniated sulfidic caustic

Kim,

I am working on an average composition for this material for you. I will have it done today. You will have it first thing in the morning.

Thanks.

From: Kim Harmon
Sent: Monday, September 29, 2008 7:43 AM
To: Gary Peterson; Sam Brown; Godefroy Gbery; Miles Root; Ryan Thomas
Cc: Matt Moser; Joe Camp; Marlin Moser
Subject: RE: Outbound reports; Ammoniated sulfidic caustic

Ryan, do you happen to have this information?

Gary, maybe the best thing to do is just to come up with an average like you said. I just need to give her something at least by the end of the day if possible.

Thanks

TARGA AMMONIATED SULFIDIC CAUSTIC PROFILE 2806

July Samples Tested

	% NaOH	pH	Specific Gravity	% Solids	Lbs. per Gallon	% Sulfide Sulfur
1	13.76	> 12.5	1.13	0	9.42	6.20
2	13.24	> 12.5	1.16	0	9.67	6.20
3	14.25	> 12.5	1.17	0	9.26	6.30
4	12.20	> 12.5	1.14	0	9.51	6.80
5	12.00	> 12.5	1.15	0	9.59	7.00
6	11.90	> 12.5	1.14	0	9.51	6.30
AVERAGE	**12.89**	**> 12.5**	**1.15**	**0**	**9.49**	**6.47**

Targa Ammoniated Sulfidic Caustic Data Sheet, 9-29-2008

NASH CALCULATION TABLE

NaHS and Na2S Calculation Table		
	Use For	Use For
	~~Sulfidity 101-200~~	~~Sulfidity 0-100~~
NaOH, wt%	17.9	17.9
Na, wt%, Calculated	10.29	10.29
Sulfide, as S, wt%	11.00	11.00
Sulfidity, Calculated	154	154
NaHS, wt%, Calculated	13.5	0
Na2S, wt%, Calculated	8.1	26.8

Use the appropriate column for the calculated values based upon the sulfidity value.
Sulfidity values from 101 to 200 use the left column and sulfidity values from 0 to 100 the right.
1.39 = 32/23 (S/Na)

		5	calc. = Input	calc. = E5
	Sodium / Sodium Hydroxide	6	calc. ~~= E5*(23/40)~~	~~calc. = E6~~
		7	calc. = Input	calc. = E7
		8	calc. = 200/(((E5*(23/40))/*1.39	calc. = E8 or F8
NaHS		9	d. = ((E8-100)*0.01)*E6(56/23)	calc. = E9
Na2S		10	calc. = ((F8)*0.01)*F6*78/96	calc. = E9

EPAHO113001330

Gary Peterson

From: Matt Bowman
Sent: Monday, September 15, 2008 4:19 PM
To: Gary Peterson; Marlin Moser; Matt Moser; Prabhaker Thangudu; Ryan Thomas; Matt Moser; Joe Camp
Cc: Miles Root; Joe Camp; Greg Bowman; Brian Weathers; Bo Cumberland; Chris Saylor
Subject: RE: NASH Production Waste Water Chemical Composition, 9-11-2008

Guys, here are my comments on this:

- Solids should read .1 to 10%
- Color/appearance should read dark grey to dark red/orange
- Other constituents (0-2%) should be relegated to the following: phenols, phenolic compounds, long chain mercaptans, sodium and potassium mercaptides, dimethyl disulfide, diethyl disulfide, iron oxide /rust, olephins, parraffins, C2-C4 amines

Also, we should have the analytical back on the sample we submitted last week in the next few days.

From: Gary Peterson
Sent: Thursday, September 11, 2008 2:57 PM
To: Marlin Moser; Matt Bowman; Matt Moser
Cc: Miles Root; Joe Camp
Subject: NASH Production Waste Water Chemical Composition, 9-11-2008

Please look at the proposed Chemical Composition "list" for the profile for the NASH Production Waste Water. On the CES profile to Newpark for the chemical composition it would read "see attached list'. This would profile to Newpark for non-hazardous deep well injection. I have included 0-50 ppm of sulfides. There might be time where the water will carry a hydrogen sulfide ppm level. Maybe 50 might be too high. Please look the list over. The listing of the remaining 0-2% constituents is a little redundant to the some of the declared %'s of first list of constituents listed but I do not think that will matter (i.e. bases, acids, caustics, sulfur compounds, thio compounds, etc.).

For physical characteristics the following are suggested:

1. **pH: 4.5-10**
2. **Density: 1.00 - 1.40**
3. **Solids: .1 – 5%**
4. **Color/Appearance: Light Reddish Orange** to Dark Red
5. **Odor: Medium to Strong**
6. **Physical State: Liquid**
7. **Phases: Single but can be bi-layered**
8. **Flash Point: GT 140 Deg F**

Let me know what you think. Should it be cut down, more added, adjust the sulfide content?

The sample has been sent out today for RUSH testing for TCLP Benzene, TCLP Metals (11) and RCI.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

CES Environmental Services, Inc.

Name of Waste: NASH Production Waste Water, Class 1 , Non-Hazardous Profile:

Attached List: NASH Production Waste Water Chemical Composition

Water : 65 – 93%
Miscellaneous Water Soluble Dissolved Chloride, Sulfate & Hydroxide Salts: 5-25 %
(Sodium, Potassium, Calcium salt types)
Miscellaneous Soluble Organic Sulfur Compound's: 1 – 10 %
Solids: 0.1 - 10% (dirt, grit, rust, filter media, road grime, organic residue)
Ammonia Compounds: 0.0 – 0.5%
Sulfuric Acid: 0.0 - .4%
Sodium Hydroxide: (0.0- .4%)
Sulfide: 0.0-50 ppm

List of Remaining constituents: 0-2 %

PHENOL'S
PHENOLIC COMPOUNDS
C2-C4 AMINE'S
SODIUM & POTASSIUM MERCAPTIDES
DIETHYL DISULFIDE
LONG CHAIN MERCAPTANS
OLEFINS
PARRAFINS
DIMETHYL DISULFIDE
IRON OXIDE/RUST

Gary Peterson

From: Miles Root
Sent: Wednesday, June 04, 2008 12:04 PM
To: Matt Bowman; Marlin Moser
Cc: Matt Moser; Joe Camp; Gary Peterson
Subject: Targa % NaHS

1,175

The % NaHS calculated on the Targa stream, evaluation 0508-67 is:

%Na X (56/23) X 0.6 = 9.3 wt%

Calculation first converts the Na to NaHS using the conversion of 56/23, where 56 is the molecular weight of NaHS. Secondly, multiplying by a conversion using sulfidity, whereby 160 sulfidity equates to 60% of the solution as being NaHS, results in the final value of %NaHS.

Miles

EPAHO113001333

Gary Peterson

From: Miles Root
Sent: Wednesday, June 04, 2008 12:22 PM
To: Matt Bowman; Marlin Moser
Cc: Matt Moser; Joe Camp; Gary Peterson
Subject: Targa Update with Na2S

Using a similar calculation for Na2S, we have the following for the Targa sulfidic caustic evaluation 0508-67.

6.4 X (78/23) X 0.4 = 8.7 wt% as Na2S.

Miles

Gary Peterson

From: Miles Root
Sent: Wednesday, June 04, 2008 10:45 AM
To: Gary Peterson
Subject: FW: Targa Evaluation Sample 0508-67

For your records.
Miles

From: Miles Root
Sent: Thursday, May 29, 2008 2:55 PM
To: Dana Carter
Cc: Marlin Moser; Matt Moser; Gary Peterson; Miles Root
Subject: Targa Evaluation Sample 0508-67

The Targa sample, evaluation 0508-67 has been tested with the following results:
pH = 12.48
density = 1.163 (equivalent to approx. 16% as NaOH)
density of concentrated NH_4OH is 0.985 (use as a reference only)
%NaOH, wt%, by titration = 11.98
%NH_4OH, wt% by titration = 10.48

Data shows that this material most likely does not contain predominately sodium hydroxide, as the density does not match the calculated wt% NaOH. Titration uses HCl, which will react with both caustic and ammonium hydroxide. The calculations above show the results as though the sample were that particular chemical. In other words, they are calculated as though either sodium hydroxide or ammonium hydroxide is the matrix. Also, the low pH of only 12.48 should be around 14 if this sample were predominately caustic. All of this shows that this stream contains both ammonium hydroxide and another salt that causes the density to be higher than what it should if the sample were only ammonium hydroxide. There might be some caustic present, or another neutral salt. Using titration as the analytical tool we cannot differentiate between the two. An ash could be run to get a better guesstimate of the %caustic present, as its ash will be high, whereas the ammonium hydroxide will have no ash.

Miles

Gary Peterson

From: Miles Root
Sent: Thursday, May 29, 2008 2:55 PM
To: Dana Carter
Cc: Marlin Moser; Matt Moser; Gary Peterson; Miles Root
Subject: Targa Evaluation Sample 0508-67

Godfrey

The Targa sample, evaluation 0508-67 has been tested with the following results:
pH = 12.48
density = 1.163 (equivalent to approx. 16% as NaOH)
density of concentrated NH_4OH is 0.985 (use as a reference only)
%NaOH, wt%, by titration = 11.98
%NH_4OH, wt% by titration = 10.48

Ammonia water

Data shows that this material most likely does not contain predominately sodium hydroxide, as the density does not match the calculated wt% NaOH. Titration uses HCl, which will react with both caustic and ammonium hydroxide. The calculations above show the results as though the sample were that particular chemical. In other words, they are calculated as though either sodium hydroxide or ammonium hydroxide is the matrix. Also, the low pH of only 12.48 should be around 14 if this sample were predominately caustic. All of this shows that this stream contains both ammonium hydroxide and another salt that causes the density to be higher than what it should if the sample were only ammonium hydroxide. There might be some caustic present, or another neutral salt. Using titration as the analytical tool we cannot differentiate between the two. An ash could be run to get a better guesstimate of the %caustic present, as its ash will be high, whereas the ammonium hydroxide will have no ash.

Miles

Gary Peterson

From: Miles Root
Sent: Wednesday, June 04, 2008 10:51 AM
To: Matt Bowman; Marlin Moser
Cc: Matt Moser; Joe Camp; Gary Peterson
Subject: Targa Sulfidic Caustic

Evaluation sample 0508-67, a sample of caustic with ammonia, was purged with air. The resulting sulfidic caustic shows the following test results:

Density 1.175

Na, wt% = 6.4
Sulfide, as S, wt% = 7.2
Sulfidity = 162

This is good looking, good concentration, and high sulfidity material. Material has no apparent ammonia odor after purging.
Purging experimental work performed by Gary Peterson.

Miles

Gary Peterson

From: Marlin Moser
Sent: Monday, June 02, 2008 11:43 AM
To: Gary Peterson
Subject: FW: Spent Caustic from LSNG
Attachments: Spent Caustic Sample 5-29-08 INTERIM REPORT.pdf; msds sodiumhydrosulfidenahstdc.pdf

FYI

From: Dana Carter
Sent: Monday, June 02, 2008 10:39 AM
To: Marlin Moser
Cc: Matt Bowman
Subject: FW: Spent Caustic from LSNG

Here is some info from targa. He said to go ahead and profile it in. Is this still ok for processing here??

Dana Carter
Account Manager
CES Environmental Services Inc
Office: 713-676-1460
Cell: 713-748-9804
Fax: 713-676-1676

From: Lewis, Orval [mailto:OLewis@targaresources.com]
Sent: Monday, June 02, 2008 10:35 AM
To: Dana Carter
Subject: Spent Caustic from LSNG

This process that is making low sulfur natural gasoline even the Caustic never really comes in contact with the Gaso stream. The process converts mercaptans to H2S and then the H2 is removed from the recycle hydrogen with the caustic. The stream is know as NaSH or sodiumhdrosulfide. MSDS is attached plus some analysis of the stream. The stream at this time contains approximately 10,000ppm ammonia which is an impurity that is in the stream at this time. This amine is not a natural part of the stream. The amine is a impurity that is in the feed stream and is being worked on to be removed from this stream.

Orval W. Lewis
Lab Technician
Targa Midstream Services
PO Box 10
Mont Belvieu, Texas 77580
Phone:281-385-3215
Cell: 281-732-7595
Email OLewis@targaresouces.com

Intertek Caleb Brett
1114 Seaco Avenue
Deer Park, TX 77536
Ph: (713) 844 - 3200
Fax: (713) 844 - 3330

Interim Report of Analysis
2008-006911-DRPK

Client:	Targa Resources, Inc.	**Date Requested:**	05/21/2008
Contact:	Mr. Orval Lewis	**Date Received:**	05/21/2008
Client Ref. No.:		**Collected By:**	Client

Client Sample Description	Product	Sample ID
Spent Caustic Trailer From LSNG. 05/21/08	Water	2008-006911-DRPK-001

Sample Results

Sample ID :	2008-006911-DRPK-001	**Date Sampled:**	05/21/2008
Sample Description :	Spent Caustic Trailer From LSNG. 05/21/08	**Date Received:**	05/21/2008
Product :	Water	**Date Analyzed:**	05/21/2008

Method	Test	Results	Units
ASTM D5623	H2S	19.2	ppm (Wt)
	COS	5.4	ppm (Wt)
	Carbon Disulfide	33.0	ppm (Wt)
	Methyl Mercaptan	<0.1	ppm (Wt)
	Ethyl Mercaptan	2.5	ppm (Wt)
	Isopropyl Mercaptan	<0.1	ppm (Wt)
	n-Propyl Mercaptan	<0.1	ppm (Wt)
	tert-Butyl Mercaptan	<0.1	ppm (Wt)
	sec-Butyl Mercaptan	<0.1	ppm (Wt)
	Isobutyl Mercaptan	<0.1	ppm (Wt)
	n-Butyl Mercaptan	<0.1	ppm (Wt)
	Ethyl Methyl Sulfide	<0.1	ppm (Wt)
	Thiophene	<0.1	ppm (Wt)
	Tetra-Hydro Thiophene	<0.1	ppm (Wt)
	2-Methyl Thiophene	<0.1	ppm (Wt)
	3-Methyl Thiophene	<0.1	ppm (Wt)
	Dimethyl Sulfide	<0.1	ppm (Wt)
	Diethyl Sulfide	<0.1	ppm (Wt)
	Dimethyl Disulfide	<0.1	ppm (Wt)
	Diethyl Disulfide	<0.1	ppm (Wt)
	Benzothiophene	<0.1	ppm (Wt)

Interim Report of Analysis

2008-006911-DRPK

Sample ID :	2008-006911-DRPK-001	**Date Sampled:**	05/21/2008
Sample Description :	Spent Caustic Trailer From LSNG. 05/21/08	**Date Received:**	05/21/2008
Product :	Water	**Date Analyzed:**	05/21/2008

Method	Test	Results	Units
HTM_G35	NOTE	As nitrogen	
	Ammonia in LPG	10739	ppm (Wt)
	Unknown 1	601	ppm (Wt)
	Unknown 2	242	ppm (Wt)
	Unknown 3	103	ppm (Wt)

This report has been reviewed for accuracy, completeness, and comparison against specifications when available. The reported results are only representative of the samples submitted for testing and are subject to confirmation upon completion of the final report. This report shall not be reproduced except in full without written approval of the laboratory.

Laboratory Review

____

Date:__________________

Reported By

____

Date:__________________

Intertek Caleb Brett
1114 Seaco Avenue, Deer Park, TX 77536
Ph: (713) 844 -3200, Fax: (713) 844 - 3330, Email: dptechctr@intertek.com, www.intertek-cb.com

Gary Peterson

From: Gary Peterson
Sent: Thursday, September 11, 2008 2:57 PM
To: Marlin Moser; Matt Bowman; Matt Moser
Cc: Miles Root; Joe Camp
Subject: NASH Production Waste Water Chemical Composition, 9-11-2008
Attachments: WWTS Chemical Composition, NASH Production Waste Water,9-11-2008 ACTIVE.doc

Please look at the proposed Chemical Composition "list" for the profile for the NASH Production Waste Water. On the CES profile to Newpark for the chemical composition it would read "see attached list'. This would profile to Newpark for non-hazardous deep well injection. I have included 0-50 ppm of sulfides. There might be times where the water will carry a hydrogen sulfide ppm level. Maybe 50 might be too high. Please look the list over. The listing of the remaining 0-2% constituents is a little redundant to the some of the declared %'s of first list of constituents listed but I do not think that will matter (i.e. bases, acids, caustics, sulfur compounds, thio compounds, etc.).

For physical characteristics the following are suggested:

1. **pH: 4.5-10**
2. **Density: 1.00 - 1.40**
3. **Solids: .1 – 5%**
4. **Color/Appearance: Light Reddish Orange to Dark Red**
5. **Odor: Medium to Strong**
6. **Physical State: Liquid**
7. **Phases: Single but can be bi-layered**
8. **Flash Point: GT 140 Deg F**

Let me know what you think. Should it be cut down, more added, adjust the sulfide content?

The sample has been sent out today for RUSH testing for TCLP Benzene, TCLP Metals (11) and RCI.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

CES Environmental Services, Inc.

Name of Waste: NASH Production Waste Water, Class 1 , Non-Hazardous
Profile:

Attached List: NASH Production Waste Water Chemical Composition

Water : 65 – 93%
Miscellaneous Water Soluble Dissolved Chloride, Sulfate & Hydroxide Salts: 5-25 %
(Sodium, Potassium, Calcium salt types)
Miscellaneous Soluble Organic Sulfur Compound's: 1 – 10 %
Solids: 0.1 - 5% (dirt, grit, rust, filter media, road grime, organic residue)
Ammonia Compounds: 0.0 – 0.5%
Sulfuric Acid: 0.0 - .4%
Sodium Hydroxide: (0.0- .4%)
Sulfide: 0.0-50 ppm

List of Remaining constituents: 0-2 %

ACIDS
ALKANES
ALKENES
ALKYNES
AMINES
AMIDES
AMMONIA
AROMATICS
BASES
CAUSTICS
CYCLIC COMPOUNDS

GLYCOLS
MERCAPTANS
METALS
MINERALS
OLEFINS
PARRAFINS
PEROXIDES
PHOSPHATES
RESINS
SULFATES
SULFUR COMPOUNDS
THIO COMPOUNDS

4-5-2008

Important Hazardous Waste Profiling Information needed from a generator along with Examples of Basic waste information, Physical Characteristics, Chemical Composition information which includes indicating a component that is on the TRI list.

Benzene NESHAP waste indication, HON waste water stream indication, Hazardous and Universa Waste Code information listing, TRI indication.

II. WASTE INFORMATION – PLEASE USE FULL NAMES RATHER THAN ACRONYMS

A. NAME OF WASTE STREAM: ______

B. DESCRIBE THE PROCESS GENERATING THE WASTE: ______

C. VOLUME: ______ D. FREQUENCY: ______ E. SAMPLE SOURCE: ______ F. WASTE CONTAINER (TRUCK,DRUM, ETC.): ______

III. PHYSICAL CHARACTERISTICS OF WASTE STREAM

A. FLASH POINT: ______ °F B. pH: ______ C. DENSITY (#/GAL OR S.G.): ______

D. COLOR/APPEARANCE: ______ E. SOLIDS (%): ______ F. ODOR: ______

G. PHYSICAL STATE: ______ H. PHASES/LAYERS: ☐ SINGLE ☐ MULTIPLE I. BTU VALUE: ______

IV. CHEMICAL COMPOSITION-CONSTITUENTS • DO NOT USE GENERIC TERMS (e.g. ORGANICS, SALT, SOLIDS, OILS) • ATTACH MSDS FOR PRODUCTS

______	______	ppm or %	______	______	ppm or %
______	______	ppm or %	______	______	ppm or %
______	______	ppm or %	______	______	ppm or %
______	______	ppm or %	______	______	ppm or %

NO ACRONYMS – PLEASE USE FULL CHEMICAL NAME *(Indicates TRI Listed Chemical) Total ______ % (Must be ≥ 100%)

V. WASTE CONTENT • PLEASE INDICATE IF THE WASTE CONTAINS ANY OF THE FOLLOWING: (ATTACH ANALYTICAL WHERE APPLICABLE)

SULFIDE ______ ppm	☐ YES	☐ NO	RADIOACTIVE ?	☐ YES	☐ NO	BENZENE NESHAP WASTE ? {40 CFR 61 SUBPART FF}	☐ YES	☐ NO
CYANIDE ______ ppm	☐ YES	☐ NO	PCB'S >50 ppm ?	☐ YES	☐ NO			
BENZENE ______ ppm	☐ YES	☐ NO	PCB TSCA WASTE?	☐ YES	☐ NO	VOC LESS THAN 500 ppmw? {40 CFR 264 SUBPART CC}	☐ YES	☐ NO
PESTICIDE/HERBICIDE ?	☐ YES	☐ NO	DIOXINS ?	☐ YES	☐ NO			
EXPLOSIVE MATERIAL ?	☐ YES	☐ NO				HON WASTEWATER STREAM? {40 CFR 63 SUBPART G}	☐ YES	☐ NO

VI. RCRA CHARACTERIZATION

A. THIS MATERIAL IS A ☐ WASTEWATER (<1% TOC AND <1% TSS) ☐ NONWASTEWATER (>= 1% TOC OR >= 1% TSS)

B. IS THIS A USEPA HAZARDOUS WASTE (40 CFR PART 261)? ☐ YES ☐ NO State of Texas UNIVERSAL WASTE (30 TAC 335.261)? ☐ YES ☐ NO

C. IF EITHER IN B IS YES, ALL APPLICABLE EPA WASTE CODE NUMBERS **MUST** BE LISTED HERE (D, F, K, P, U): ______

51B

51B

LAB
T-32
8/4/09
CE

Gary Peterson

From: Marlin Moser
Sent: Tuesday, March 18, 2008 9:57 AM
To: Matt Bowman; Greg Bowman
Cc: Brian Weathers; Bo Cumberland; Steve Stricker; Karl Guidry; Gary Peterson; Loren Thomas; Prabhaker Thangudu; Clark Hickman
Subject: Safety considerations for SIB system

Gentlemen,

These are some items we need to address with regard to the new system we are putting in for SIB since this stream has the potential to release Hydrogen Sulfide if something goes wrong.

- We need to have H2S monitors in the surrounding area of the process tank to alarm if levels would get high. Loren is pricing a system
- A vent fan tied to the alarm system should be installed to automatically evacuate vapor from the enclosed building if a release occurs. Steve was going to look into a contractor to install the fan.
- Supplied air needs to be available on top of the cat walk. Do we want to purchase this or rent?
- The generator needs to be moved up and controls rewired to come on as backup power if we lose power during operations. It needs to be wired to every part of the system we need including the scrubber. Steve is going to talk to the generator folks. This will be expensive because we have to put a switch box in and consolidate breakers. Time will also be an issue so we should start soon.
- Prabhaker needs to line up safety training on H2S for processing and maintenance personnel. We also need formal training in how to use breathing air. This needs to be done next week before we start. It may need to be done in several session so everyone is included.
- A job safety analysis needs to be done on this whole process to ensure we are not missing anything. It would be best to have it done by Thursday so we have time to react to it.
- WCM should be contacted to determine whether or not we need a PBR on this process.

We should not begin processing until all the above has been addressed We need to be realistic about getting all these items into place. If any of the above are going to not be complete by next Wednesday, we need to let Matt know.

If anyone has any other safety concern then what I have listed please bring it to my attention immediately.

Marlin

Gary Peterson

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Sent: Tuesday, March 18, 2008 9:57 AM
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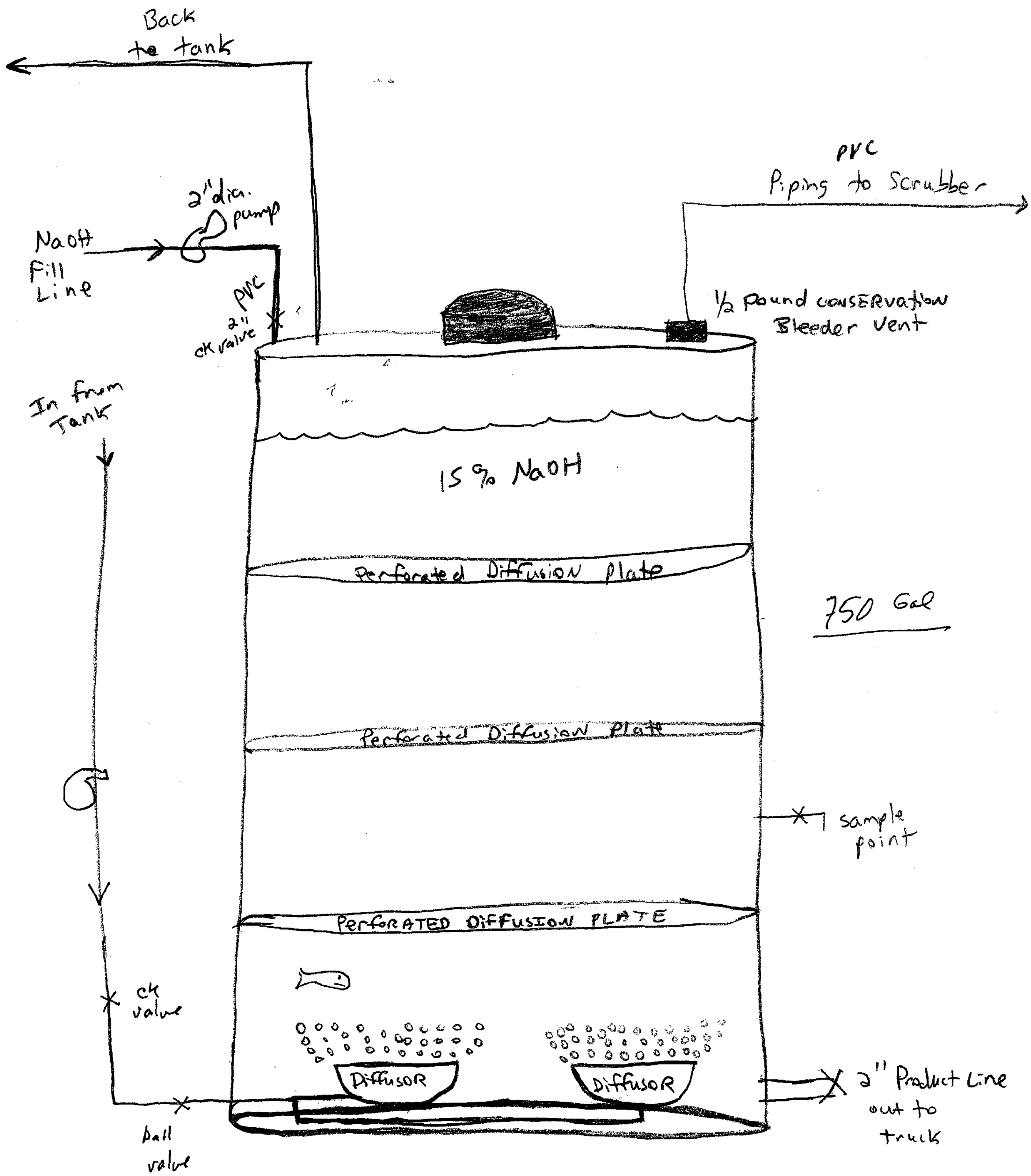
Marlin

Nash Tank



Back to tank
PVC Piping to Scrubber
2" dia. pump
NaOH Fill Line
PVC
2" ck valve
½ Pound conservation Bleeder Vent
In from Tank
15% NaOH
Perforated Diffusion Plate
750 Gal
Perforated Diffusion Plate
sample point
Perforated Diffusion Plate
ck valve
Diffusor
Diffusor
2" Product Line out to truck
ball valve

Motor, Pump, and Piping for filling Treatmnt tank and Nash Tank

Materials

- 2 inch carbon steel piping
- Electric Motor and Trash pump for fill to Treatmnt Tank
- Special unloading hose with water infusion point (crow's foot) near truck valve / unload point on truck
- Pipe hangers for overhead piping to fill Treatmnt Tank
- 2" check valve near discharge point at top of Treatment Tank

Note: NaOH fill to Nash should be "Angled" (Lowest point at Nash Tank)

- 2" PVC pipe for caustic fill line to Nash tank
- 2" Check valve near top of NaOH fill line to Nash Tank
- Several 90 degree junctions and collars for all PVC fill pipings
- Primer and Glue

Manpower

Piping and Vents to existing scrubber System

materials

- 3 - 1/2 pound 2 way Conservation bleeder valves
- 2" PVC Ball Valve for top of Treatment Tank
- 2" PVC Piping sufficient to run 2 main Lines (from Treatment Tank and NASH TANK) plus 3 truncks from Treatment tank
- Primer and Glue
- Pipe hangers for overhead piping
- Several 90 degree joints and collars

manpower

Discharge Piping from Treatment Tank and NaSH Tank

3

materials

- 3 inch Ball value for piping to Line Leading to sludge tank for filter press
- 45 degree junction for 3" Line to sludge tank Line
- 3" piping for Line from treatment tank to Line Leading to filter press tank
- 4 - 2" ball values for discharge piping from Treatment Tank to city water discharge Line
- 3" ~~2"~~ carbon steel piping for main Line and four discharge truck Lines (from Treatment tank to COH discharge Line)
- 4 - ½ inch values and piping for discharge sample points on Treatment Tank
- 2" PVC Ball value for NaSH Product Discharge
- 2" Steel ~~PVC~~ piping from NaSH Tank to Truck Load out area - air pump + air line
- Several 45° and 90° unions, collars, and Joints for PVC piping for NaSH discharge Line
- Primer and Glue

manpower

INTERCONNECTING PUMP and Piping ~~Between~~ Treatment TANK and NASH TANK (Including diffusor system)

(4)

Materials

- Special small baffles (carbon steel) to prevent back splashing of material being treated into the gas line between the two tanks
- 2 inch carbon steel piping for gas line from Treatment TANK to NASH TANK
- 4 - 45° junctions for special "Angled" area on inlet and outlet piping to allow liquids to drop back into Treatment TANK
- 2" plastic Air diaphragm pump with pressure regulator
- 2" Metal Piping from Nash TANK back into Treatment TANK
- All fittings, junctions, and collars for this piping
- 2" internal Nash Tank piping split separately to 2 diffusor plates
- 2 special gas diffusor plates
- 2 inch Ball valve for line from air pump to bottom of NASH TANK

Manpower

Nash Tank

materials

- 24" manway
- ½ inch valve and pipe for sample PORT
- 3 - perforated Diffusion Plates

manpower

Treatement chemical Storage Tanks and
Treatment Chemical feed to Treatment Tank

Materials
- Electrical Line and conduit ~~to~~ feed power to acid feed pum
- LMI electric pump for acid feed (up to 3 GPM)
- 1½ inch PVC Line for sulfuric Acid feed Line to Treatment Tank (Include all Vales, unions, collars)
- 1½" PVC check value for acid feed line to Treatment Tank
- 750-1000 gallon plastic, upright tank for Acid Storage w/ Ball Value on bott
- 1½ inch PVC Line (overhead), angled to feed Acid Storage TANK
- 2 inch PVC LIME from Lime mix tank to Treatment Tank
- 2 inch Plastic or metal diaphragm pump for Lime ~~feed~~ Line from Lime tank to treatment Tank
- 2 inch PVC check Value between Lime feed pump and treatment tank (Near Treatment Tank)
- 1 inch steel piping, collars and connections to feed air from compressor/Air Line to Lime feed diaphragm pump
- 1 inch PVC Line from polymer Aging tank to Treatment Tank
- 1 Inch PVC Check value ON LINE from polymer aging tank to Treatment Tank (near Treatment Tank)
- LMI feed Pump (electric) for polymer feed
- 750-1,000 gallon plastic tank (with PVC ball value at bottom) for storage of Bleach
- LMI pump for bleach feed to Treatment Tank
- 1½ inch PVC Line from bleach tank to Treatment Tank
- 1½ inch PVC check Value for Line between bleach tank and treatment tank (near Treatment TANK)
- Electrical Line and conduit to feed Power power to LMI pump for bleach
- 1½ inch PVC Line (overhead), "Angled" to feed bleach Storage tank

Manpower

Treatment TANK

Materials

- 2 Carbon steel Manways
- Bracing and collars for impellor shaft
- Electric Motor to run impellor
- Bracing for impellor and motor on top of treatment tank
- Electric motor to run impellor
- Impellor and shaft
- Electrical line and conduit to run impellor motor
- Electrical Switches, breakers, etc. to run motor, shut off, etc
- 2 - removable pH Probes
- Electrical line and conduit to pH probes
- 8 oz. Pressure Gauge
- Removable Thermocouple
- Electrical line and conduit to thermocouple
- Rolled CONE bottom for Tank

Rentals

- Crane to get tank into and out of building

Manpower

PRECISION PETROLEUM LABS, INC.

5915 Star Lane Houston, TX 77057
Ph. 713-680-9425 Fax: 713-680-9564

CERTIFICATE OF ANALYSIS

Company:	CES Environmental Services, Inc
Invoice No.:	37316
Lab Reference No:	2008-04-590
Product ID:	SIB 4-4-08 Trailer #255 Log#0804-72 4-21-2008
Date Received:	04-21-2008
Authorized By:	Miles Root

PARAMETER	TEST METHOD	TEST RESULTS
TKN, Mg/L	S.M. 4500 NB	40
Ammonia, Mg/L	S.M. 4500-NH3F	28

Test Result may have been effected due to high sulfur level in product

Daniel Zabihi
QA Manager
Date:04-23-2008
BRL = Below Reporting Limit

Ammonia Testing

CES Environmental Services, Inc.

TESTING LABORATORY IDENTIFICATION & INFORMATION:
Precision Laboratories

CHAIN of CUSTODY RECORD

CES Environmental Services, Inc.
4904 Griggs Road
Houston, TX 77021
Main Number: (713) 676-1460
Fax Number: (713) 676-1676

Test Results Reporting
CES Environmental Services, Inc.
Main Number: (713) 676-1460
Fax Number: (713) 676-1676
Call Gary Peterson for ammonia #, phone 832 367-1383

Project Name	Sample Name	Comments/Special Instructions:
SIB Processing	SIB 4-14-08 Trailer # 255	**Turnaround Time Required:** DATE and/or Number of Days: RUSH
Contact: Gary R Peterson 832 367-1383		
SAMPLER: PRINT: OPerations SIGN:		**OTHER INFORMATION:** this material has about 35,000 ppm of Sulfides, the pH is ≥ 12.54 su. The sample is suspected to contain about 4,000 - 5,000 ppm of ammonia.
Type and Number of Containers (CIRCLE): Glass 1 2 3 Grab 4 5 6 Other:		SAMPLE NAME/ID ('s): SIB 4-14-08 Trailer # 255 **CES Sample LOG BK Number ('s):** 0408-72 4-21-08

Requested Analysis: Ammonia (specific ion Electrode) ☐
TKN ☐

1. Relinquished By:	Date:	Time:	2. Received By:	Date:	Time:
Gary Peterson	4-21-08	11:05 AM			
3. Relinquished By:	Date:	Time:	4. Received By:	Date:	Time:
5. Relinquished By:	Date:	Time:	6. Received By:	Date:	Time:

3

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4-25-08 JOB Number (or other type of information): trailer 124238-2

Customer, Product Description, Other Information Job # 62248

PRODUCT : SIB

TOC: 2,416 pH=10.0

Metals:

Product Physical Characteristics			
Density (S.G.)	~~Boiling Point (F,C)~~ pH	Sulfide	Mercaptan
1.366	12.22	40,030	2,400

STARTING VOLUME: 200

OTHER INFORMATION: ~~3,000~~ gallons
11.43#/gal $\boxed{2,619}$ Gallons
[1.6 - 2.1]

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION		
	Gallons	
	655	25%
	917	35%
	320.5	12.25%
	3.3 gal	.125%
	306	11.7%
	26 gal	1%

PROCESSING NOTES:
25% H_2O_2 50 ml 142°F pH: 10
35% H_2O ~~70~~ 4ml 128°F

Acid Sat
~~10ml~~ pH= 8.5
~~15ml~~ pH=7.4 151°F
12.25% ~~20ml~~ pH 4.0 pH < 4.0 - solids gummy -
~~21ml~~ 4.0 — Creamy Orange solution
~~23ml~~ 3.0 " "
24 pH 2.6 " "
24.5 pH=1.6 " "

.125% Ferric .25 ml

Lime ~~10ml~~
11.7% ~~14ml~~ pH 4
~~17ml~~ pH - 4.5
~~19ml~~ 4.8
21ml 6.0
22ml 7.0
23ml 7.5 = 23.4 ml
~~30ml~~ ~~10~~

poly ~~[illegible]~~ 2ml

Product Processing Log Sheet, Edited Master, 3-21-2008 GRP

EPAHO113001358

CES Environmental Services, Inc.

3

PRODUCT PROCESSING DATA REPORT

Date: 4-25-08 JOB Number (or other type of information): trailer 124238-2

Customer, Product Description, Other Information Job # 62248

PRODUCT: SIB

TOC: 2416

Metals: Cd Cu Cr Ni Zn
.311 .35 .5 1.1 .3

STARTING VOLUME: 200

Product Physical Characteristics			
Density (S.G.)	~~Boiling Point (F,C)~~ pH	Sulfide	Mercaptan
1.366	12.22	40,030	2,400

OTHER INFORMATION:
~~3700~~ gallons
11.43#/gal $\boxed{2,619}$

[1.6 - 2.1]

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

PROCESSING NOTES:

1
2 25% H_2O_2 50ml 142°F pH: 10
35% H_2O ~~70~~ 4ml 128°F
3
4 Acid Sat
~~10ml~~ pH= 8.5
5
~~15ml~~ pH = 7.4 151°F
6 12.26%
~~20ml~~ pH 4.0 pH < 4.0 - solids gummy -
7 ~~21ml~~ 4.0 - Creamy Orange solution
8 ~~23ml~~ 3.0 " "
9 24 pH 2.6 " "
10 24.5 pH=1.6 " "
11 .125% Ferric .25ml
12 Lime ~~10ml~~
13 ~~14ml~~ pH 4
14 117% ~~17ml~~ pH = 4.5
15 ~~19ml~~ 4.8
21ml 6.8
16 22ml 7.0
17 23ml 7.5 = 23.4 ml
~~24ml 10~~
18
19 poly ~~tot~~ 2ml
20 cd 0.31 PPm CU 0.350 PPm Zn: 0.301
21 Cr 0.514 PPm Ni 1.081 PPm

SIB Hazardous Wastewater TREATMENT PROCESSING

4-28-2008

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 62248 , 4-28-2008

Manifest Number: 004014645 JJK

Trailer Number: 124238-2

Gallons: 2,619, 29,940 pounds ALL TREATMENT VOLUMES BASED ON THIS QUANTITY

pH= 12.22 , density = 1.37

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

For the pH target the pH is 1.9 (range 1.6 -2.0). It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK. The SIB material has a density that varies. When the density is determined this value can be used to determine the gallons of material to be tested. Multiply the density by 8.345 to determine the pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. Divide the pounds received by the calculated pounds per gallon value obtained to determine the total gallons received.

1. ***655 (25% BY VOLUME)*** **gallons of 10% CONCENTRATION hydrogen peroxide; 917 gallons of water *(35% BY VOLUME)* (TOTAL peroxide & water equal approximately 60% of the received volume of SIB).** The first step of the treatment process is treatment with a 10% concentration of Hydrogen Peroxide. The required amount of the 10% Hydrogen Peroxide treatment chemical is *25 %* by volume of the received material and the water is *35 %* by volume of the received material. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.** This rate may need to be slowed down. **During this part of the treatment process the temperature can reach as high as 180 degrees F, *ADD WITH CAUTION; THE PEROXIDE REACTION CAN BE VERY VIOLENT IF ADDED TO FAST, REDUCE GPM TO 3 GPM OR LOWER IF NECESSARY.*.** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ***pH TARGET = 1.9*** **ADD 320.5 GALLONS (approximately, 12.25 % of the received volume of SIB) OF SULFURIC ACID (ADD SLOWLY, sludge will start to form around a pH of 9.5 but it will mix in and become a solid. *The sludge formed in this load during acid addition is pretty thick. The sludge starts forming around the pH of 9.0.* The gallon volume required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If**

<u>more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. This is the only way to reach the proper pH end point. IMPORTANT: During the acid addition the acid may remain in the top sludge phase during treatment. If this happens then a large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast exotherm and a very fast PRESSURE RISE. ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS).</u> The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. **<u>The acid treatment pH target point is a pH of 1.9 su (RANGE 1.6 – 2.0).</u>** **IMPORTANT:** ***<u>During the acid addition the acid may remain in the top sludge phase during treatment. If this happens then a large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast exotherm and a very fast PRESSURE RISE. ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY</u>***

<u>**(HOMOGENEOUS).**</u> When this pH has been reached <u>***(and the mixture in the reaction vessel is homogeneous [all well mixed together] as required above)***</u> then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a VERY slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. This is very important. <u>During this part of the treatment process there is also an exotherm that can reach as high as 150 degrees F and higher.</u> ***Also during this acid part of the treatment process there is the formation of solids. The solid formation starts forming slightly at the start of acid addition and continues to increase through the acid treatment step. <u>AT A PH OF 4.0 THE ACID ADDITION SHOULD BE SLOWED DOWN. THE HEAVY SOLIDS START TO FORM FROM ACID DIGESTION OF THE ORGANIC. VERY GOOD MIXING & AGITATION IS REQUIRED AT THIS POINT.</u> At the pH of 4.0 the treatment solution will start to become a creamy orangish solution. This will clear up with continuing treatment. The solids when first formed are soft and have a tendency to stick to one another and form clumps. With continued agitation during treatment the solids harden and break up.*** <u>**At this stage of treatment there is an increased rate of degassing and pressure in the tank with the volume of gasses going to the scrubbers increasing.**</u> <u>THE **CRITICAL ISSURE** DURING THIS PHASE OF TREATMENT IS THE **PRESSURE** FORMED BY THE RELEASE OF GASES FORMED FROM THE MATERIAL REACTION WITH ACID AND **CAPTURING** OF THESE GASSES IN THE CAUSTIC NASH TANK.</u> These gas vapors are flammable, odorous and toxic and must be controlled. The addition rate of the concentrated sulfuric acid is .5 gallons per minute to add all of the acid required. **SUGGESTION:** <u>RAMP THE ACID ADDITION FROM VERY SLOW IN THE BEGINNING TO INCREASING THE GPM FOR ADDITIONAL % VOLUME INCREMENTS. START AT .25 GPM FOR THE FIRST ACID ADDITION TREATMENT. WHEN THE PH STARTS TO DECREASE THEN THE ACID ADDITION CAN BE INCREASED. WHEN THE PH REACHES A PH OF 11.0 SU THEN SLOWLY INCREASE THE ACID ADDITION TO .5 GPM. MONITOR THE PRESSURE AND TEMPERATURE OF THE TREATMENT TANK CAREFULLY.</u> Monitor the pH of the reaction vessel. When the pH of the tank is at a

10 pH or lower the acid addition ramp can be increased above the .5 gpm. MONITOR THE TEMPERATURE; IF THE VESSEL IS TOO HOT THEN THE ACID ADDITION RAMP CANNOT BE INCREASED. Just like in step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. The gallons of 93% sulfuric acid required to treat this material varies by volume. This volume will vary from 2% up to as high as over 7% by volume of the material to be treated. The closer the pH of the treatment vessel gets to a pH of 7.5 the faster the pH will drop to the 5 pH range with just a small amount of acid added. AT THIS POINT OF TREATMENT CATCH A SAMPLE OFTEN FOR PH TESTING TO MAKE SURE THE PH DOES NOT GO BELOW A 4.5. **THE PH TARGET FOR PH TREATMENT IS 1.9** (1.6 – 2.0). When the pH target point is reached catch a sample and test it for the presence of sulfides and mercaptans. **The sulfide content must be less than 3 ppm and at the target pH the sulfides will be driven off as a gas. If there are sulfides still present at the pH of 2.0 (or lower) greater than 3 ppm then continue the agitation and head space scrubbing of the material in the treatment vessel into the caustic NASH scrubber.** ***The sulfides at the target pH (1.9) will be driven off to the scrubber; this may just take a little more mixing & process scrubbing time.*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 1.9 pH, 1.6 – 2.0 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. ADD 3.3 GALLONS OF FERRIC CHLORIDE **Ferric Chloride** addition. Add a total volume of ferric chloride to be **.125 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. ADD 306 GALLONS OF LIME, TARGET PH IS 9.0 (approximately, 11.7 % of the received volume of SIB), gradually add lime and check the pH and color until you reach the target pH. **Lime** addition. Add a total volume of a well mixed lime slurry solution to be **11.7 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. **ADD SLOWLY** *[check the pH of the reaction vessel during the lime additions to make sure the target pH of 9.0 is not over shot, as mentioned above to remove the dark red color the lime addition may be*

able to stop the lime addition prior to the entire volume being added. **The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.** Proceed to step 5.

5. ADD 26 GALLONS OF POLYMER (approximately, 1 % of the received volume of SIB). **Plant polymer** addition. Add a total volume of a well mixed plant polymer solution to be in the **1 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. ADD SLOWLY. Proceed to step 6.
6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.
7. With all of the processing steps completed catch a sample from the mixing vessel. Make sure the sample caught is representative of the treated material in the tank. There will be quite a bit of solids that have formed in the treatment steps performed above. Make sure the sample has been treated properly and will process through the filter press [THERE WILL NOT BE A WHOLE LOT OF SOLIDS, ABOUT 18%, ABOUT 32% BACK CALCULATED TO THE ORIGINAL VOLUME OF SIB). Test for pH, sulfides, mercaptans, TOC and metals (THE QUICK ammonia TEST shows high ppm of ammonia, the waste stream only has about 28 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.
8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

The Solids are 20% not back calculated to the original volume.

SIB, BATCH TRAILER 124238-2 Treatment Processing, 4-28-2008

Gary Peterson

From: Gary Peterson
Sent: Tuesday, April 29, 2008 1:09 PM
To: Miles Root; Matt Bowman
Cc: Marlin Moser
Subject: SIB Testing, 4-29-2008

Miles,

The following is a high priority item.

Five trailers of SIB are being sampled. A composite of these trailers will be made. The testing request to be run on the composite of these trailers is as follows:

1. pH
2. Density
3. Sodium Hydroxide %
4. Sodium Carbonate %
5. Sodium Hydrosulfide %
6. Sodium Sulfide %

The profile number for this material is 2696. The declared chemical composition of this material is noted on the waste profile for this material. I know that not starting with an absolute known Sodium hydroxide and sulfide chemical compound information that the establishment of the requested values is not going to be easy. With this information how well and accurate can you titrate and calculate the requested testing information 1 through 5 above (1 & 2 are easy) ??

The trailers being sampled for compositing and testing are:

1. 2815
2. 638035
3. 255
4. 239
5. 241

Thanks,

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4-~~29~~ 25-08 JOB Number (or other type of information): 62261, LT-638

Customer, Product Description, Other Information

PRODUCT : SIB

Product Physical Characteristics			
Density (S.G.)	~~Boiling Point (F,C)~~ pH	Sulfide	Mercaptan
1.34	12.64	38,750	31,500

OTHER INFORMATION: 2,544 GALLONS

STARTING VOLUME: 100

PROCESSING INFORMATION

#	SPECIFIC DATA LOG INFORMATION		
1			
2			
3			1526
4			Gallons
5			
6			
7			153
8			
9			
10			2½ Gal
11			
12			636 Gal
13			
14			56 Gal
15			
16			
17			
18			
19			
20			
21			

80%

PROCESSING NOTES:

60% 10% Conc. H_2O_2
~~10ml~~
~~20ml~~
~~30ml~~
~~40ml~~ 140°F
~~50ml~~ 160F
60ml 172°F pH = 10

6% Acid 5ml pH = 9
6ml pH = 4.5

.1% Ferric .1ml dark greenish

Lime ~~1ml~~
1.5ml pH = 7.0
2.5ml pH 8.0
pH = 8.0

Poly .2ml

14% SOLIDS

Bach Cal. = 24%

Product Processing Log Sheet, Edited Master, 3-21-2008

GRP

EPAHO113001367

SIB Hazardous Wastewater TREATMENT PROCESSING

4-19-2008

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 62261

Manifest Number: 004014609 JJK

Trailer Number: LT-638 3750

Gallons: ~~2,544~~ (calculated) ALL VOLUMES BASED ON THIS QUANTITY

1.6789 Factor

pH= 12.64 , density = 1.34

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK. The SIB material has a density that varies. When the density is determined this value can be used to determine the gallons of material to be tested. Multiply the density by 8.345 to determine the pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. Divide the pounds received by the calculated pounds per gallon value obtained to determine the total gallons received.

2,561

1. ~~1,526~~ gallons of 10% CONCENTRATION hydrogen peroxide (approximately 60% of the received volume of SIB). The first step of the treatment process is treatment with a 10% concentration of Hydrogen Peroxide. The required amount of the 10% Hydrogen Peroxide treatment chemical is *60%* by volume of the received material. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.** This rate may need to be slowed down. **During this part of the treatment process the temperature can reach as high as 180 degrees F, ADD WITH CAUTION.** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ADD ~~153~~ 257 GALLONS (approximately, 6% of the received volume of SIB) OF SULFURIC ACID (ADD SLOWLY, sludge will start to form around a pH of 9.5 but it will mix in and become a solid. ***The sludge formed in this load is not as high as usual.*** The gallon volume required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. This is the only way to reach the proper pH end point. IMPORTANT: During the acid addition the acid may

<u>remain in the top sludge phase during treatment. If this happens then a large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast exotherm and a very fast PRESSURE RISE. ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS).</u> The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. **<u>The acid treatment pH target point is a pH of 4.5 su (+/- 1 pH su, 3.5 – 5.5).</u> IMPORTANT: <u>During the acid addition the acid may remain in the top sludge phase during treatment. If this happens then a large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast exotherm and a very fast PRESSURE RISE. ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS).</u>** When this pH has been reached ***<u>(and the mixture in the reaction vessel is homogeneous [all well mixed together] as required</u>***

above) then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a VERY slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. This is very important. During this part of the treatment process there is also an exotherm that can reach as high as 150 degrees F and higher. Also during this acid part of the treatment process there is the formation of salt solids. The solid formation starts forming slightly at the start of acid addition and continues to increase through the acid treatment step. The solids when first formed are soft and have a tendency to stick to one another and form clumps. With continued agitation during treatment the solids harden and break up. **At this stage of treatment there is an increased rate of degassing and pressure in the tank with the volume of gasses going to the scrubbers increasing.** THE **CRITICAL ISSURE** DURING THIS PHASE OF TREATMENT IS THE **PRESSURE** FORMED BY THE RELEASE OF GASES FORMED FROM THE MATERIAL REACTION WITH ACID AND **CAPTURING** OF THESE GASSES IN THE CAUSTIC NASH TANK. These gas vapors are flammable, odorous and toxic and must be controlled. The addition rate of the concentrated sulfuric acid is .5 gallons per minute to add all of the acid required. **SUGGESTION:** RAMP THE ACID ADDITION FROM VERY SLOW IN THE BEGINNING TO INCREASING THE GPM FOR ADDITIONAL % VOLUME INCREMENTS. START AT .25 GPM FOR THE FIRST ACID ADDITION TREATMENT. WHEN THE PH STARTS TO DECREASE THEN THE ACID ADDITION CAN BE INCREASED. WHEN THE PH REACHES A PH OF 11.0 SU THEN SLOWLY INCREASE THE ACID ADDITION TO .5 GPM. MONITOR THE PRESSURE AND TEMPERATURE OF THE TREATMENT TANK CAREFULLY. Monitor the pH of the reaction vessel. When the pH of the tank is at a 10 pH or lower the acid addition ramp can be increased above the .5 gpm. MONITOR THE TEMPERATURE; IF THE VESSEL IS TOO HOT THEN THE ACID ADDITION RAMP CANNOT BE INCREASED. Just like in step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. The gallons of 93% sulfuric acid required to treat this material varies by volume. This volume will vary from 2% up to as high as over 7% by volume of the material to be treated. The closer the pH of the treatment vessel gets to a pH of 7.5 the faster the pH will drop to the 5 pH range with just a small amount of acid added. AT THIS POINT OF TREATMENT CATCH A SAMPLE OFTEN FOR PH TESTING TO MAKE SURE THE PH DOES NOT GO BELOW A 4.5. **THE PH TARGET FOR PH TREATMENT IS 4.5** (3.5-5.5). When the pH target point is reached catch a sample and test it for the presence of sulfides and mercaptans. **The**

sulfide content must be less than 3 ppm and at the target pH the sulfides will be driven off as a gas. If there are sulfides still present at the pH of 4.5 greater than 3 ppm then continue the agitation and head space scrubbing of the material in the treatment vessel into the caustic NASH scrubber. ***The sulfides at the target pH will be driven off to the scrubber; this may just take a little more mixing time.*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 4.5 pH, 3.5 – 5.5 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

4.2

3. ADD ~~2 1/2~~ GALLONS OF FERRIC CHLORIDE **Ferric Chloride** addition. Add a total volume of ferric chloride to be **.1 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

105 gl

4. ADD ~~63~~ GALLONS OF LIME, for this treat to remove the very dark red color on the water target for a pH of 8.0 (approximately, 2.5% of the received volume of SIB), gradually add lime and check the pH and color until you reach the target pH (if you see a good light rose color before reaching the target pH STOP at this point, the lime addition can be considered complete. **Lime** addition. Add a total volume of a well mixed lime slurry solution to be **2.5 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. **ADD SLOWLY** [*check the pH of the reaction vessel during the lime additions to make sure the target pH of 8.0 is not over shot, as mentioned above to remove the dark red color the lime addition may be able to stop the lime addition prior to the entire volume being added.* **The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the**

tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point. Proceed to step 5.

5. ADD ~~5~~ 8 gal GALLONS OF POLYMER (approximately, .2% of the received volume of SIB). **Plant polymer** addition. Add a total volume of a well mixed plant polymer solution to be in the **.2 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Make sure the sample caught is representative of the treated material in the tank. There will be quite a bit of solids that have formed in the treatment steps performed above. Make sure the sample has been treated properly and will process through the filter press [THERE WILL NOT BE A WHOLE LOT OF SOLIDS, ABOUT 14%, 24% BACK CALCULATED TO THE ORIGINAL VOLUME OF SIB). Test for pH, sulfides, mercaptans, TOC and metals (also ammonia which can be as high as 5,000 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4-21-08 JOB Number (or other type of information): 62260, Manifest 124221-1

Customer, Product Description, Other Information 28,240 # ~~2,102~~ GAL 2,526

PRODUCT : 51B

Product Physical Characteristics			
Density (S.G.)	~~Boiling Point (F,C)~~ pH	Sulfide	Mercap
1.34	12.72	3.972%	3.10%

OTHER INFORMATION: O.I (top floating Organic) = 5.5%
Flash point = 158°F
#'s/gallon = 11.18

STARTING VOLUME: 300 ml

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION		

124

PROCESSING NOTES:

1 8% H_2O_2 200 gal 10% 8%
2 8% 200 gal H_2O 8%
24 ml
3 24 ml

300
48
25
373

4 Acid ~~5ml~~
5 ~~10ml~~
6 ~~15ml~~ 138°F pH = 10
~~17ml~~ pH = 10
7 ~~19ml~~ pH = 9
8 ~~20ml~~ Sludge formation starts 8.49
210 GALLONS 8.3%
9 ~~21ml~~
~~22ml~~ pH: 8 Heavy sludge
10 ~~23ml~~ pH = 8.0 HEAVY Sludge
11 ~~23.5ml~~ 7.5
12 24.5 6
13 25 ml pH = 4.86

40 gallons
14 Lime ~~1ml~~ pH 7.5
15 1.5% 1.5 pH = 9.0
16
17 Poly ~~.25~~
.35% .35 ml
18
19
20
21

CES Environmental Services, Inc.

2

PRODUCT PROCESSING DATA REPORT

Date: 4-25-08 **JOB Number (or other type of information):** Trailer 124223-2

Custom[redacted]duct Description, Other Information Job # 62351

PRODUCT SIB

Product Physical Characteristics			
Density (S.G.)	~~Boiling Point (F,C)~~ pH	Sulfide	Mercaptan
1.37	12.28	22,936	72,220

OTHER INFORMATION:
#/gal = 11.43 41,080 #'s = 3,594 gallons

STARTING VOLUME: 300 mls

Total Vol = 300 + 180 + 17.4 = 497.4 = 166 mls

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION		
Ferric / LIME / Poly		
100 ml = (166 mls)		
3 Ferric	= .8 ml	~~3~~ gal
.8%	29 gal	
4 Lime	ml	pH
	~~XXXXX~~ ~~2.2~~	~~2.7~~ 24.28
2.4%	~~2.5 ml~~	8.2 86 gal
Go for 2.4 ml –		
5	up to pH 8.0	
Poly	.4 ml	Solids
.4%	14 gal	10%
Corrected 2	27%	
Mix more Agitate		

1

	PROCESSING NOTES:		
1	60% H_2O_2 180 mls	2,156 H_2O_2 gal	
2		°F	
3	pH =		
4	20 mls ~~30 ml~~	VIOLENT	114
5	~~40~~		118
6	~~50~~ ~~60~~		134
7	~~70~~		142
7	~~80~~		150
8	~~90~~		154
9	~~100~~		158 Do not add Per. when °F is >150°F
10	(150) ~~110~~		158
10	~~120~~	VIOLENT	162 at temp >150
11	slow down H_2O_2 addition – even stop		
12	Let tank cool some (10-20°F)		
12	~~130~~	Reaction Violence Slows Down	166°F
13	~~140~~		168
14	(160) ~~150~~		166
14	(158) ~~160~~		161
15	~~170~~ ~~180~~		158 pH = 10-10.5
16	Acid ~~5ml~~ (~~XXXX~~) (128°F)	pH – 10	Ex – nothing
17	208 gal ~~9ml~~	135	pH – 9.0 S = 830 M = 1,600
18	5.8% ~~11ml~~ ~~2ml~~		pH = 9
19	~~13~~		8.5 Heavy sludge Forming
20	Must pH < 5.0 14		8.5 pH 9 – 8.5
20	~~15~~		8.0
21	make sure pH is changing – Not on drum in cake sludge		

16 ml pH – 7 Heavy Sl

16.5 pH = 5.8 17 ml ≥ 5.5

17.2 ml 5 GRP

17.4 ml 4053

Product Processing Log Sheet, Edited Master, 3-21-2008

EPAHO113001375

2nd Treat 2

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4-28-08 **JOB Number (or other type of information):** trailer 124223

Customer, Product Description, Other Information

PRODUCT : SIB

Product Physical Characteristics			
Density (S.G.)	**Boiling Point (F,C)**		

STARTING VOLUME: ~~300~~ 200

OTHER INFORMATION: 3,594 gal

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
		899 gal	1
		1,258 gal	2
			3
			4
			5
			6
		413 gal	7
			8
			9
			10
		3.6 gal	11
			12
			13
		305 gal	14
			15
			16
		23 gal	17
			18
			19
			20
			21

PROCESSING NOTES:

25% H_2O_2 50mls 145°F
35% H_2O 70mls

ACID to c pH 2.0 11.5%
~~5ml~~
~~5ml~~ 154°F
~~15ml~~ 8.5
~~17ml~~ 152F 4.5 Acid exo + violence done
~~18ml~~ 3.0
~~19ml~~ 3.0 Treat mix turns milky orangish
20ml pH 2.4 digesting organics
~~21ml~~ pH 2.28 ← GOWE
~~22ml~~ - Reaction exo v pressure
23ml pH = 1.94 11.5%

FERRIC .2ml .1%

LIME ~~8ml~~ pH 4
~~11ml~~ pH 4.5
~~14ml~~ pH 5
~~16ml~~ pH 7
17ml pH 8 8.5%

poly ~~the~~ 1.3ml .65%

Product Processing Log Sheet, Edited Master, 3-21-2008 GRP

EPAHO113001376

Gary Peterson

From: Gary Peterson
Sent: Monday, April 28, 2008 2:37 PM
To: Matt Bowman; Marlin Moser; Bo Cumberland; Brian Weathers
Subject: Trailer 124223, Edited Treatment ; 4-28-2008
Attachments: SIB, BATCH TRAILER 124223-2 EDITED Treatment Processing, 4-28-2008.doc

Attached, target pH is 2.0 (1.9 – 2.1). Treated water is a light yellow.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

SIB Hazardous Wastewater TREATMENT PROCESSING

4-26-2008

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 62351

Manifest Number: 00401671 JJK

Trailer Number: 124223-2

Gallons: 3,594, 41,080 pounds ALL TREATMENT VOLUMES BASED ON THIS QUANTITY

pH= 12.28 , density = 1.37

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

For the pH target the pH is 4.5 (range 3.0 - 4.9). It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK. The SIB material has a density that varies. When the density is determined this value can be used to determine the gallons of material to be tested. Multiply the density by 8.345 to determine the pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. Divide the pounds received by the calculated pounds per gallon value obtained to determine the total gallons received.

1. ***2,156*** gallons of 10% CONCENTRATION hydrogen peroxide (approximately 60% of the received volume of SIB). The first step of the treatment process is treatment with a 10% concentration of Hydrogen Peroxide. The required amount of the 10% Hydrogen Peroxide treatment chemical is *60%* by volume of the received material. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.** This rate may need to be slowed down. **During this part of the treatment process the temperature can reach as high as 180 degrees F, *ADD WITH CAUTION; THE PEROXIDE REACTION CAN BE VERY VIOLENT IF ADDED TO FAST, REDUCE GPM TO 3 GPM OR LOWER IF NECESSARY*..** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ADD 208 GALLONS (approximately, 5.8% of the received volume of SIB) OF SULFURIC ACID (ADD SLOWLY, sludge will start to form around a pH of 9.5 but it will mix in and become a solid. ***The sludge formed in this load during acid addition is pretty thick. The sludge starts forming around the pH of 9.0.*** The gallon volume required is not an exact volume. As you near the

<u>pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. This is the only way to reach the proper pH end point. IMPORTANT: During the acid addition the acid may remain in the top sludge phase during treatment. If this happens then a large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast exotherm and a very fast PRESSURE RISE. ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS).</u> The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. **<u>The acid treatment pH target point is a pH of 4.5 su (RANGE 3 – 4.9).</u>** **IMPORTANT:** ***<u>During the acid addition the acid may remain in the top sludge phase during treatment. If this happens then a</u>***

large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast exotherm and a very fast PRESSURE RISE. ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY **(HOMOGENEOUS).** When this pH has been reached ***(and the mixture in the reaction vessel is homogeneous [all well mixed together] as required above)*** then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a VERY slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. This is very important. During this part of the treatment process there is also an exotherm that can reach as high as 150 degrees F and higher. Also during this acid part of the treatment process there is the formation of salt solids. The solid formation starts forming slightly at the start of acid addition and continues to increase through the acid treatment step. The solids when first formed are soft and have a tendency to stick to one another and form clumps. With continued agitation during treatment the solids harden and break up. **At this stage of treatment there is an increased rate of degassing and pressure in the tank with the volume of gasses going to the scrubbers increasing.** THE **CRITICAL ISSURE** DURING THIS PHASE OF TREATMENT IS THE **PRESSURE** FORMED BY THE RELEASE OF GASES FORMED FROM THE MATERIAL REACTION WITH ACID AND **CAPTURING** OF THESE GASSES IN THE CAUSTIC NASH TANK. These gas vapors are flammable, odorous and toxic and must be controlled. The addition rate of the concentrated sulfuric acid is .5 gallons per minute to add all of the acid required. **SUGGESTION:** RAMP THE ACID ADDITION FROM VERY SLOW IN THE BEGINNING TO INCREASING THE GPM FOR ADDITIONAL % VOLUME INCREMENTS. START AT .25 GPM FOR THE FIRST ACID ADDITION TREATMENT. WHEN THE PH STARTS TO DECREASE THEN THE ACID ADDITION CAN BE INCREASED. WHEN THE PH REACHES A PH OF 11.0 SU THEN SLOWLY INCREASE THE ACID ADDITION TO .5 GPM. MONITOR THE PRESSURE AND

<u>TEMPERATURE OF THE TREATMENT TANK CAREFULLY.</u> Monitor the pH of the reaction vessel. When the pH of the tank is at a 10 pH or lower the acid addition ramp can be increased above the .5 gpm. MONITOR THE TEMPERATURE; IF THE VESSEL IS TOO HOT THEN THE ACID ADDITION RAMP CANNOT BE INCREASED. Just like in step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. The gallons of 93% sulfuric acid required to treat this material varies by volume. This volume will vary from 2% up to as high as over 7% by volume of the material to be treated. The closer the pH of the treatment vessel gets to a <u>pH of 7.5</u> the faster the pH will drop to the 5 pH range with just a small amount of acid added. AT THIS POINT OF TREATMENT CATCH A SAMPLE OFTEN FOR PH TESTING TO MAKE SURE THE PH DOES NOT GO BELOW A 4.5. **<u>THE PH TARGET FOR PH TREATMENT IS 4.5</u>** (3.0 4.9). When the pH target point is reached catch a sample and test it for the presence of sulfides and mercaptans. **The sulfide content must be less than 3 ppm and at the target pH the sulfides will be driven off as a gas. If there are sulfides still present at the pH of 4.5 greater than 3 ppm then continue the agitation and head space scrubbing of the material in the treatment vessel into the caustic NASH scrubber.** ***<u>The sulfides at the target pH (4.5) will be driven off to the scrubber; this may just take a little more mixing & process scrubbing time.</u>*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 4.5 pH, 3.5 – 5.5 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. <u>ADD 29 GALLONS OF FERRIC CHLORIDE</u> **<u>Ferric Chloride</u>** addition. Add a total volume of ferric chloride to be **<u>.8 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. <u>ADD 86 GALLONS OF LIME, for this treat to remove the very dark red color on the water target for a pH of 8.0 (approximately, 2.4% of the received volume of SIB), gradually add lime and</u>

<u>check the pH and color until you reach the target pH (if you see a good light rose color before reaching the target pH STOP at this point, the lime addition can be considered complete.</u> **<u>Lime</u>** addition. Add a total volume of a well mixed lime slurry solution to be **<u>2.5 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. **<u>ADD SLOWLY</u>** <u>[*check the pH of the reaction vessel during the lime additions to make sure the target pH of 8.0 is not over shot, as mentioned above to remove the dark red color the lime addition may be able to stop the lime addition prior to the entire volume being added.*</u> **<u>The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.</u>** Proceed to step 5.

5. <u>ADD 14 GALLONS OF POLYMER (approximately, .4% of the received volume of SIB).</u> **Plant polymer** addition. Add a total volume of a well mixed plant polymer solution to be in the **<u>.4 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. ADD SLOWLY. Proceed to step 6.
6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.
7. With all of the processing steps completed catch a sample from the mixing vessel. Make sure the sample caught is representative of the treated material in the tank. There will be quite a bit of solids that have formed in the treatment steps performed above. Make sure the sample has been treated properly and will process through the filter press [THERE WILL NOT BE A WHOLE LOT OF SOLIDS, ABOUT 14%, 24% BACK CALCULATED TO THE ORIGINAL VOLUME OF SIB). Test for pH, sulfides, mercaptans, TOC and metals (also ammonia which can be as high as 5,000 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process

through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

SIB Hazardous Wastewater TREATMENT PROCESSING

4-28-2008

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 62351 EDITED, 4-28-2008

Manifest Number: 00401671 JJK

Trailer Number: 124223-2

Gallons: 3,594, 41,080 pounds ALL TREATMENT VOLUMES BASED ON THIS QUANTITY

pH= 12.28 , density = 1.37

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

For the pH target the pH is 2.0 (range 1.9 -2.1). It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK. The SIB material has a density that varies. When the density is determined this value can be used to determine the gallons of material to be tested. Multiply the density by 8.345 to determine the pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. Divide the pounds received by the calculated pounds per gallon value obtained to determine the total gallons received.

1. ***899 (25% BY VOLUME)*** gallons of 10% CONCENTRATION hydrogen peroxide; 1,258 gallons of water ***(35% BY VOLUME)*** (TOTAL peroxide & water equal approximately 60% of the received volume of SIB). The first step of the treatment process is treatment with a 10% concentration of Hydrogen Peroxide. The required amount of the 10% Hydrogen Peroxide treatment chemical is *25 %* by volume of the received material and the water is *35 %* by volume of the received material. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.** This rate may need to be slowed down. **During this part of the treatment process the temperature can reach as high as 180 degrees F, *ADD WITH CAUTION; THE PEROXIDE REACTION CAN BE VERY VIOLENT IF ADDED TO FAST, REDUCE GPM TO 3 GPM OR LOWER IF NECESSARY..*** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ***pH TARGET = 2.0*** ADD 413 GALLONS (approximately, 11.5 % of the received volume of SIB) OF SULFURIC ACID (ADD SLOWLY, sludge will start to form around a pH of 9.5 but it will mix in and become a solid. ***The sludge formed in this load during acid addition is***

pretty thick. The sludge starts forming around the pH of 9.0. **The gallon volume required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. This is the only way to reach the proper pH end point. IMPORTANT: During the acid addition the acid may remain in the top sludge phase during treatment. If this happens then a large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast exotherm and a very fast PRESSURE RISE. ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS).** The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. **The acid treatment pH target point is a pH of 2.0su (RANGE 1.9 – 2.1).** **IMPORTANT:** ***During the acid addition the acid may remain in the top sludge phase during treatment. If this happens then a large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast exotherm and a very fast PRESSURE RISE. ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY*** **(HOMOGENEOUS).** When this pH has been reached ***(and the mixture in the reaction vessel is homogeneous [all well mixed together] as required above)*** then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a VERY slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. This is very important. During this part of the treatment process there is also an exotherm that can reach as high as 150 degrees F and higher. Also during this acid part of the treatment process there is the formation of salt solids. The solid formation starts forming slightly at the start of acid addition and continues to increase through the acid treatment step. The solids when first formed are soft and have a tendency to stick to one another and form clumps. With continued agitation during treatment the solids harden and break up. **At this stage of treatment there is an increased rate of degassing and pressure in the tank with the volume of gasses going to the scrubbers increasing.** THE **CRITICAL ISSURE** DURING THIS PHASE OF TREATMENT IS THE **PRESSURE** FORMED BY THE RELEASE OF GASES FORMED FROM THE MATERIAL REACTION WITH ACID AND **CAPTURING** OF THESE GASSES IN THE CAUSTIC NASH TANK. These gas vapors are flammable, odorous and toxic and must be controlled. The addition rate of the concentrated sulfuric acid is .5 gallons per minute to add all of the acid required. **SUGGESTION:** RAMP THE ACID ADDITION FROM VERY SLOW IN THE

BEGINNING TO INCREASING THE GPM FOR ADDITIONAL % VOLUME INCREMENTS. START AT .25 GPM FOR THE FIRST ACID ADDITION TREATMENT. WHEN THE PH STARTS TO DECREASE THEN THE ACID ADDITION CAN BE INCREASED. WHEN THE PH REACHES A PH OF 11.0 SU THEN SLOWLY INCREASE THE ACID ADDITION TO .5 GPM. MONITOR THE PRESSURE AND TEMPERATURE OF THE TREATMENT TANK CAREFULLY. Monitor the pH of the reaction vessel. When the pH of the tank is at a 10 pH or lower the acid addition ramp can be increased above the .5 gpm. MONITOR THE TEMPERATURE; IF THE VESSEL IS TOO HOT THEN THE ACID ADDITION RAMP CANNOT BE INCREASED. Just like in step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. The gallons of 93% sulfuric acid required to treat this material varies by volume. This volume will vary from 2% up to as high as over 7% by volume of the material to be treated. The closer the pH of the treatment vessel gets to a pH of 7.5 the faster the pH will drop to the 5 pH range with just a small amount of acid added. AT THIS POINT OF TREATMENT CATCH A SAMPLE OFTEN FOR PH TESTING TO MAKE SURE THE PH DOES NOT GO BELOW A 4.5. **THE PH TARGET FOR PH TREATMENT IS 2.0** (1.9 – 2.1). When the pH target point is reached catch a sample and test it for the presence of sulfides and mercaptans. **The sulfide content must be less than 3 ppm and at the target pH the sulfides will be driven off as a gas. If there are sulfides still present at the pH of 2.0 greater than 3 ppm then continue the agitation and head space scrubbing of the material in the treatment vessel into the caustic NASH scrubber.** ***The sulfides at the target pH (2.0) will be driven off to the scrubber; this may just take a little more mixing & process scrubbing time.*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 2.0 pH, 1.9 – 2.1 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. ADD 3.6 GALLONS OF FERRIC CHLORIDE **Ferric Chloride** addition. Add a total volume of ferric chloride to be **.1 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. <u>ADD 305 GALLONS OF LIME, for this treat to remove the very dark red color on the water target for a pH of 8.0 (approximately, 8.5 % of the received volume of SIB), gradually add lime and check the pH and color until you reach the target pH (if you see a good light rose color before reaching the target pH STOP at this point, the lime addition can be considered complete.</u> **<u>Lime</u>** addition. Add a total volume of a well mixed lime slurry solution to be **<u>8.5 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. **<u>ADD SLOWLY</u>** *<u>[check the pH of the reaction vessel during the lime additions to make sure the target pH of 8.0 is not over shot, as mentioned above to remove the dark red color the lime addition may be able to stop the lime addition prior to the entire volume being added.</u>* **<u>The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.</u>** Proceed to step 5.

5. <u>ADD 23 GALLONS OF POLYMER (approximately, .65% of the received volume of SIB).</u> **Plant polymer** addition. Add a total volume of a well mixed plant polymer solution to be in the **<u>.65 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Make sure the sample caught is representative of the treated material in the tank. There will

be quite a bit of solids that have formed in the treatment steps performed above. Make sure the sample has been treated properly and will process through the filter press [THERE WILL NOT BE A WHOLE LOT OF SOLIDS, ABOUT 14%, 24% BACK CALCULATED TO THE ORIGINAL VOLUME OF SIB). Test for pH, sulfides, mercaptans, TOC and metals (also ammonia which can be as high as 5,000 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

The final solids are 18% of the total batch, this is not the corrected % solids.

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

4,264

Date: 4-21-08 **JOB Number (or other type of information):** Trailer 255

#2

Customer, Product Description, Other Information

PRODUCT: SIB

Product Physical Characteristics			
Density (S.G.)	~~Boiling Point (F,C)~~ pH	Sulfide	Mercaptan
1.33	12.54	3.923%	.21%

OTHER INFORMATION: Ammonia 4,000-5,000.

STARTING VOLUME: 300 mls

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
1			GALLONS
2			Added
3			
4			
5			362
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			17 gal 1179 ml
18			81 gal ~~77 gal~~
19			11 gal
20			
21			

1179 ml for 100 ml treat

PROCESSING NOTES:

9.4% ① 10% H_2O_2 (9.4%)

28.1 ml

300 ml
28.1 ml
25.5 ml
353.6

② Acid (≈ 21 ml = 7%)

5 ml = OK

8.5% 5 ml = Start of Sludge pH = 10.2 134°F

5 ml = Sludge pH = 9.0 144°F

20 5 ml = Sludge pH = 8.5 151°F

.5 ml = — pH = 8.5

21 .5 ml = — pH = 8.0

22 .5 ml = — pH = 8.0

5 ml = — 8.0

23 .5 ml .5 ml pretty heavy sludge pH = 7.2
Mix in top sludge layer prior to Ferric
This will take time = 30-60 min or more

23.5 .5 ml — pH = 7

24.5 1 ml — pH = 6.0

.5 ml pH = ~~5.0~~ 5.05

25.5 .5 ml pH = 4.11 (dark Orange vinegarish odor)

Ferric .4 ml (%) 4.1 Dark Olive greenish yellow

Lime ~~1.8~~ 1% 1.9% pH = 11.08 (dark red) 12.1 More rose

Poly .25 ml %

Solids 35% Solids

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

4,264

Date: 4-18-08 **JOB Number (or other type of information):** Trailer 255

Customer, Product Description, Other Information

PRODUCT : SIB

Product Physical Characteristics			
Density (S.G.)	~~Boiling Point (F,C)~~ pH	Sulfide	Mercaptan
1.33	12.54	3.923%	0.21%

OTHER INFORMATION: Ammonia = 4,000 - 5,000

STARTING VOLUME: 300 ml

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION		

$\frac{561}{3} = \boxed{187}$

PROCESSING NOTES:

Total Vol = 300 + 90 + 150 + 21 = 561.2

1 30% H_2O_2 90 ml pH = 10.4
2 50% water 150 ml
3 Acid 5 ml pH = 9.83
4 5 ml pH = 9 Some Sludge starting
5 7% 21 ml 5 ml pH = 9 Heavy sludge buildup
6 5 ml pH = 6.5 Heavy sludge " ", goes
7 13% ~~.4%~~ 1 ml pH = ~~5~~ 4.21 back into solution.
S = 0 Mer = 1,000
8 Ferric ~~.5 ml~~ ~~.2 ml~~ .4
9 ~~Ferric 100 ml SIB (187 ml total)~~
~~.4%~~ ~~.2%~~
10
11 Lime 2% 100 ml (187 ml)
12 Poly 2 ml pH = 11.58 (Add 1.8 ml, 1.8%
.25 ml
13 $\boxed{189}$ 2,000 - 2,500 ppm Ammonia
14 Solids / 4% = 26.5 Solids
15
16 TOC = 3,913
17
18
19
20
21

Product Processing Log Sheet, Edited Master, 3-21-2008

GRP

Gary Peterson

From: Gary Peterson
Sent: Monday, April 21, 2008 6:13 PM
To: Marlin Moser; Bo Cumberland
Subject: SIB Batch Trailer 255 Processing Info. 4,21-2008
Attachments: SIB, BATCH TRAILER 255 Treatment Processing, 4-21-2008.doc

Attached.

With the changes in treatment the top sludge formation is reduced by quite a bit in the acidification step. Please read the processing instructions; Acid treatment – add slowly, pH changes should be taking place as indicated on the vessel pH meter. If not then stop acid addition and let the mixture homogenize (also reach a pH of 4.5 +/- 1 and make sure sulfides are less than 3 ppm, this may take time to let the low pH solution release all of the sulfide to the caustic capturing system; Lime treatment - add slowly, to remove the dark red color because of the changes in treatment a pH target of 8.5 is not high enough. Process lime slowly and monitor the color, a pH as high as a 11.5-12.0 may be necessary.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

SIB Hazardous Wastewater TREATMENT PROCESSING

4-19-2008

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 62247

Manifest Number: 004014605 JJK

Trailer Number: 255

Gallons: 4,264 (from the manifest)

pH= 12.54 , density = 1.33

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK. The SIB material has a density that varies. When the density is determined this value can be used to determine the gallons of material to be tested. Multiply the density by 8.345 to determine the pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. Divide the pounds received by the calculated pounds per gallon value obtained to determine the total gallons received.

1. ***ADDED-DONE*** gallons of 10% CONCENTRATION hydrogen **peroxide.** The first step of the treatment process is treatment with a 10% concentration of Hydrogen Peroxide. The required amount of the 10% Hydrogen

Peroxide treatment chemical is __% by volume of the received material. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.** This rate may need to be slowed down. **During this part of the treatment process the temperature can reach as high as 140 degrees F.** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ADD 362 GALLONS OF SULFURIC ACID (ADD SLOWLY, A sludge will start to form around a pH of 9.5 but it will mix in and become a solid. The gallon volume required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. This is the only way to reach the proper pH end point. IMPORTANT: During the acid addition the acid may remain in the top sludge phase during treatment. If this happens then a large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast exotherm and a very fast PRESSURE RISE. **ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT**

PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS). The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. **The acid treatment pH target point is a pH of 4.5 su (+/- 1 pH su, 3.5 – 5.5). IMPORTANT: During the acid addition the acid may remain in the top sludge phase during treatment. If this happens then a large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast exotherm and a very fast PRESSURE RISE. ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS).** When this pH has been reached ***(and the mixture in the reaction vessel is homogeneous [all well mixed together] as required above)*** then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a VERY slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. This is very important. During this part of the treatment process there is also an exotherm that can reach as high as 150 degrees F and higher. Also during this acid part of the treatment process there is the formation of salt solids. The solid formation starts forming slightly at the start of acid addition and continues to increase through the acid treatment step. The solids when first formed are soft and have a tendency to stick to one another and form clumps. With continued agitation during treatment the solids harden and break up. **At this stage of treatment there is an increased rate of degassing and pressure in the tank with the volume of gasses going to the scrubbers increasing.** THE **CRITICAL ISSURE** DURING THIS PHASE OF TREATMENT IS THE **PRESSURE** FORMED BY THE RELEASE OF GASES FORMED FROM THE MATERIAL REACTION WITH ACID AND **CAPTURING** OF THESE GASSES IN THE CAUSTIC NASH TANK. These gas vapors are flammable, odorous and toxic and must be controlled. The addition rate of the concentrated sulfuric acid is .5 gallons per minute to add all of the acid required. **SUGGESTION:** RAMP THE ACID ADDITION FROM VERY SLOW IN THE BEGINNING TO INCREASING THE GPM FOR ADDITIONAL % VOLUME INCREMENTS. START AT .25 GPM FOR THE FIRST ACID ADDITION TREATMENT. WHEN THE PH STARTS TO DECREASE THEN THE ACID ADDITION CAN BE INCREASED. WHEN THE PH REACHES A PH OF 11.0 SU THEN SLOWLY INCREASE THE ACID ADDITION TO .5 GPM. MONITOR THE PRESSURE AND TEMPERATURE OF THE TREATMENT TANK CAREFULLY. Monitor the pH of the reaction vessel. When the pH of the tank is at a 10 pH or lower the acid addition ramp can be increased above the .5 gpm. MONITOR THE TEMPERATURE; IF THE VESSEL IS TOO HOT THEN THE ACID ADDITION RAMP CANNOT BE INCREASED. Just like in step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. The gallons of 93% sulfuric acid required to treat this material varies by volume. This volume will vary from 2% up to as high as over 7% by volume of the material to be treated. The closer the pH of the treatment vessel gets to a pH of 7.5 the faster the pH will drop to the 5 pH range with just a small amount of acid added. AT THIS POINT OF TREATMENT CATCH A SAMPLE OFTEN FOR PH TESTING TO MAKE SURE THE PH DOES NOT GO BELOW A 4.5. **THE PH TARGET FOR PH TREATMENT IS 4.5** (3.5-5.5). When the pH target point is reached catch a sample and test it for the presence of sulfides and mercaptans. **The sulfide content must be less than 3 ppm and at the target pH the sulfides will be driven off as a gas. If there are sulfides still present at the pH of 4.5 greater than 3 ppm then continue the agitation and head space scrubbing of the material in the treatment vessel into the caustic NASH scrubber. *The sulfides at the target pH will be driven off to the scrubber; this may just take a little more mixing time.* Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 4.5 pH, 3.5 –

5.5 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. <u>ADD 17 GALLONS OF FERRIC CHLORIDE</u> **<u>Ferric Chloride</u>** addition. Add a total volume of ferric chloride to be **<u>.4 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. **<u>ADD 81 GALLONS OF LIME, for this treat to remove the very dark red color on the water target for a pH of 12.0, gradually add lime and check the pH and color when you reach a pH of 8.5, the color change is a little different for this treatment.</u>** **<u>Lime</u>** addition. Add a total volume of a well mixed lime slurry solution to be **<u>1.9 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. **<u>ADD SLOWLY</u>** ***<u>[check the pH of the reaction vessel during the lime additions to make sure the target pH of 8.5 - 9.0 is not over shot, as mentioned above to remove the dark red color the lime addition may need to go to a pH of 11.5 – 12.0 to reach the lighter rose color].</u>*** **<u>The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.</u>** Proceed to step 5.

5. <u>ADD 11 GALLONS OF POLYMER</u> **Plant polymer** addition. Add a total volume of a well mixed plant polymer solution to be in the **<u>.25 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Make sure the sample caught is representative of the treated material in the tank. There will be quite a bit of solids that have formed in the treatment steps performed above. Make sure the sample has been treated properly and will process through the filter press [THERE WILL BE A LOT OF SOLIDS, ABOUT 39%). Test for pH, sulfides, mercaptans, TOC and metals (also ammonia which can be as high as 5,000 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

Gary Peterson

From: Gary Peterson
Sent: Monday, April 21, 2008 6:13 PM
To: Marlin Moser; Bo Cumberland
Subject: SIB Batch Trailer 255 Processing Info. 4,21-2008
Attachments: SIB, BATCH TRAILER 255 Treatment Processing, 4-21-2008.doc

Attached.

With the changes in treatment the top sludge formation is reduced by quite a bit in the acidification step. Please read the processing instructions; Acid treatment – add slowly, pH changes should be taking place as indicated on the vessel pH meter. If not then stop acid addition and let the mixture homogenize (also reach a pH of 4.5 +/- 1 and make sure sulfides are less than 3 ppm, this may take time to let the low pH solution release all of the sulfide to the caustic capturing system; Lime treatment - add slowly, to remove the dark red color because of the changes in treatment a pH target of 8.5 is not high enough. Process lime slowly and monitor the color, a pH as high as a 11.5-12.0 may be necessary.

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SIB Hazardous Wastewater TREATMENT PROCESSING

4-19-2008

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 62247

Manifest Number: 004014605 JJK

Trailer Number: 255

Gallons: 4,264 (from the manifest)

pH= 12.54 , density = 1.33

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK. The SIB material has a density that varies. When the density is determined this value can be used to determine the gallons of material to be tested. Multiply the density by 8.345 to determine the pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. Divide the pounds received by the calculated pounds per gallon value obtained to determine the total gallons received.

1. ***ADDED-DONE*** gallons of 10% CONCENTRATION hydrogen peroxide. The first step of the treatment process is treatment with a 10% concentration of Hydrogen Peroxide. The required amount of the 10% Hydrogen

Peroxide treatment chemical is __% by volume of the received material. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.** This rate may need to be slowed down. **During this part of the treatment process the temperature can reach as high as 140 degrees F.** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. **ADD 362 GALLONS OF SULFURIC ACID (ADD SLOWLY, A sludge will start to form around a pH of 9.5 but it will mix in and become a solid. The gallon volume required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. This is the only way to reach the proper pH end point. IMPORTANT: During the acid addition the acid may remain in the top sludge phase during treatment. If this happens then a large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast exotherm and a very fast PRESSURE RISE. ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT**

PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS). The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. **The acid treatment pH target point is a pH of 4.5 su (+/- 1 pH su, 3.5 – 5.5). IMPORTANT: During the acid addition the acid may remain in the top sludge phase during treatment. If this happens then a large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast exotherm and a very fast PRESSURE RISE. ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS).** When this pH has been reached ***(and the mixture in the reaction vessel is homogeneous [all well mixed together] as required above)*** then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a VERY slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides *still present then continue to add volumes of sulfuric acid in % volume increments of* .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. This is very important. During this part of the treatment process there is also an exotherm that can reach as high as 150 degrees F and higher. Also during this acid part of the treatment process there is the formation of salt solids. The solid formation starts forming slightly at the start of acid addition and continues to increase through the acid treatment step. The solids when first formed are soft and have a tendency to stick to one another and form clumps. With continued agitation during treatment the solids harden and break up. **<u>At this stage of treatment there is an increased rate of degassing and pressure in the tank with the volume of gasses going to the scrubbers increasing.</u>** <u>THE **CRITICAL ISSURE** DURING THIS PHASE OF TREATMENT IS THE **PRESSURE** FORMED BY THE RELEASE OF GASES FORMED FROM THE MATERIAL REACTION WITH ACID AND **CAPTURING** OF THESE GASSES IN THE CAUSTIC NASH TANK.</u> These gas vapors are flammable, odorous and toxic and must be controlled. The addition rate of the concentrated sulfuric acid is .5 gallons per minute to add all of the acid required. **SUGGESTION:** <u>RAMP THE ACID ADDITION FROM VERY SLOW IN THE BEGINNING TO INCREASING THE GPM FOR ADDITIONAL % VOLUME INCREMENTS. START AT .25 GPM FOR THE FIRST ACID ADDITION TREATMENT. WHEN THE PH STARTS TO DECREASE THEN THE ACID ADDITION CAN BE INCREASED. WHEN THE PH REACHES A PH OF 11.0 SU THEN SLOWLY INCREASE THE ACID ADDITION TO .5 GPM. MONITOR THE PRESSURE AND TEMPERATURE OF THE TREATMENT TANK CAREFULLY.</u> Monitor the pH of the reaction vessel. When the pH of the tank is at a 10 pH or lower the acid addition ramp can be increased above the .5 gpm. MONITOR THE TEMPERATURE; IF THE VESSEL IS TOO HOT THEN THE ACID ADDITION RAMP CANNOT BE INCREASED. Just like in step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. The gallons of 93% sulfuric acid required to treat this material varies by volume. This volume will vary from 2% up to as high as over 7% by volume of the material to be treated. The closer the pH of the treatment vessel gets to a <u>pH of 7.5</u> the faster the pH will drop to the 5 pH range with just a small amount of acid added. AT THIS POINT OF TREATMENT CATCH A SAMPLE OFTEN FOR PH TESTING TO MAKE SURE THE PH DOES NOT GO BELOW A 4.5. **<u>THE PH TARGET FOR PH TREATMENT IS 4.5</u>** (3.5-5.5). When the pH target point is reached catch a sample and test it for the presence of sulfides and mercaptans. **The sulfide content must be less than 3 ppm and at the target pH the sulfides will be driven off as a gas. If there are sulfides still present at the pH of 4.5 greater than 3 ppm then continue the agitation and head space scrubbing of the material in the treatment vessel into the caustic NASH scrubber. *<u>The sulfides at the target pH will be driven off to the scrubber; this may just take a little more mixing time.</u>* Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 4.5 pH, 3.5 –

5.5 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. <u>ADD 17 GALLONS OF FERRIC CHLORIDE</u> **<u>Ferric Chloride</u>** addition. Add a total volume of ferric chloride to be **<u>.4 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. <u>ADD 81 GALLONS OF LIME, for this treat to remove the very dark red color on the water target for a pH of 12.0, gradually add lime and check the pH and color when you reach a pH of 8.5, the color change is a little different for this treatment.</u> **<u>Lime</u>** addition. Add a total volume of a well mixed lime slurry solution to be **<u>1.9 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. **<u>ADD SLOWLY</u>** *<u>[check the pH of the reaction vessel during the lime additions to make sure the target pH of 8.5 - 9.0 is not over shot, as mentioned above to remove the dark red color the lime addition may need to go to a pH of 11.5 – 12.0 to reach the lighter rose color].</u>* **<u>The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.</u>** Proceed to step 5.

5. <u>ADD 11 GALLONS OF POLYMER</u> **Plant polymer** addition. Add a total volume of a well mixed plant polymer solution to be in the **<u>.25 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Make sure the sample caught is representative of the treated material in the tank. There will be quite a bit of solids that have formed in the treatment steps performed above. Make sure the sample has been treated properly and will process through the filter press [THERE WILL BE A LOT OF SOLIDS, ABOUT 39%). Test for pH, sulfides, mercaptans, TOC and metals (also ammonia which can be as high as 5,000 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

SIB Hazardous Wastewater TREATMENT PROCESSING

4-19-2008

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 62260

Manifest Number: 004014606 JJK

Trailer Number: 124221-1

Gallons: 2,526 (calculated)

pH= 12.72 , density = 1.34

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK. The SIB material has a density that varies. When the density is determined this value can be used to determine the gallons of material to be tested. Multiply the density by 8.345 to determine the pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. Divide the pounds received by the calculated pounds per gallon value obtained to determine the total gallons received.

1. ***200*** **gallons of 10% CONCENTRATION hydrogen peroxide (57 gallons of 35% peroxide w/ 143 gallons of water (approximately**

<u>8% of the received volume of SIB).</u> The first step of the treatment process is treatment with a 10% concentration of Hydrogen Peroxide. The required amount of the 10% Hydrogen Peroxide treatment chemical is *8%* by volume of the received material. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **<u>The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.</u>** <u>This rate may need to be slowed down.</u> **<u>During this part of the treatment process the temperature can reach as high as 140 degrees F.</u>** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. <u>ADD 210 GALLONS (approximately, 8.3% of the received volume of SIB) OF SULFURIC ACID (ADD SLOWLY, a sludge will start to form around a pH of 9.5 but it will mix in and become a solid. The gallon volume required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. This is the only way to reach the proper pH end point. IMPORTANT: During the acid addition the acid may remain in the top sludge phase during treatment. If this happens then a large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast</u>

<u>exotherm and a very fast PRESSURE RISE. ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS).</u> The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. **<u>The acid treatment pH target point is a pH of 4.5 su (+/- 1 pH su, 3.5 – 5.5).</u>** **<u>IMPORTANT: During the acid addition the acid may remain in the top sludge phase during treatment. If this happens then a large quantity of acid will move into the liquid phase of SIB in the reaction vessel. When or if this happens the addition of this slug of acid will cause a fast exotherm and a very fast PRESSURE RISE. ADD ACID SLOWLY, MONITOR THE PH, IF THE PH IS NOT DROPPING NOTICIABLY DURING THE ACID ADDITION TREATMENT PHASE THEN STOP THE ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS).</u>** When this pH has been reached ***<u>(and the mixture in the reaction vessel is homogeneous [all well mixed together] as required above)</u>*** then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a VERY slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. This is very important. <u>During this part of the treatment process there is also an exotherm that can reach as high as 150 degrees F and higher.</u> Also during this acid part of the treatment process there is the formation of salt solids. The solid formation starts forming slightly at the start of acid addition and continues to increase through the acid treatment step. The solids when first formed are soft and have a tendency to stick to one another and form clumps. With continued agitation during treatment the solids harden and break up. **<u>At this stage of treatment there is an increased rate of degassing and pressure in the tank with the volume of gasses going to the scrubbers increasing.</u>** <u>TH E **CRITICAL ISSURE** DURING THIS PHASE OF TREATMENT IS THE **PRESSURE** FORMED BY THE RELEASE OF GASES FORMED FROM THE MATERIAL REACTION WITH ACID AND **CAPTURING** OF THESE GASSES IN THE CAUSTIC NASH TANK.</u> These gas vapors are flammable, odorous and toxic and must be controlled. The addition rate of the concentrated sulfuric acid is .5 gallons per minute to add all of the acid required. **SUGGEST ON:** <u>RAMP THE ACID ADDITION FROM VERY SLOW IN THE BEGINNING TO INCREASING THE GPM FOR ADDITIONAL % VOLUME INCREMENTS. START AT .2 GPM FOR THE FIRST ACID ADDITION TREATMENT. WHEN THE PH STARTS TO DECREASE THEN THE ACID ADDITION CAN BE INCREASED. WHEN THE PH REACHES A PH OF 11.0 SU THEN SLOWLY INCREASE THE ACID ADDITION TO .5 GPM. MONITOR THE PRESSURE AND TEMPERATURE OF THE TREATMENT TANK CAREFULLY.</u> Monitor the pH of the reaction vessel. When the pH of the tank is at a 10 pH or lower the acid addition ramp can be increased above the .5 gpm. MONITOR THE TEMPERATURE; IF THE VESSEL IS TOO HOT THEN THE ACID ADDITION RAMP CANNOT BE INCREASED. Just like in step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. The gallons of 93% sulfuric acid required to treat this material varies by volume. This volume will vary from 2% up to as high as over 7% by volume of the material to be treated. The closer the pH of the treatment vessel gets to a <u>pH of 7.5</u> the faster the pH will drop to the 4.5 pH range with just a small amount of acid added. AT THIS POINT OF TREATMENT CATCH A SAMPLE OFTEN FOR PH TESTING TO MAKE SURE THE PH DOES NOT GO BELOW 4.5. **<u>THE PH TARGET FOR PH TREATMENT IS 4.5</u>** (3.5-5.5). When the pH target point is reached catch a sample and test it for the presence of sulfides and mercaptans. **The sulfide content must be less than 3 ppm and at the target pH the sulfides will be driven off as a gas. If there are sulfides still present at the pH of 4.5 greater than 3 ppm then continue the agitation and head space scrubbing of the material in the treatment vessel into the caustic NASH scrubber.** ***<u>The sulfides at the target pH will be given off the</u>***

vessel. This is very important. During this part of the treatment process there is also an exotherm that can reach as high as 150 degrees F and higher. Also during this acid part of the treatment process there is the formation of salt solids. The solid formation starts forming slightly at the start of acid addition and continues to increase through the acid treatment step. The solids when first formed are soft and have a tendency to stick to one another and form clumps. With continued agitation during treatment the solids harden and break up. **At this stage of treatment there is an increased rate of degassing and pressure in the tank with the volume of gasses going to the scrubbers increasing.** THE **CRITICAL ISSURE** DURING THIS PHASE OF TREATMENT IS THE **PRESSURE** FORMED BY THE RELEASE OF GASES FORMED FROM THE MATERIAL REACTION WITH ACID AND **CAPTURING** OF THESE GASSES IN THE CAUSTIC NASH TANK. These gas vapors are flammable, odorous and toxic and must be controlled. The addition rate of the concentrated sulfuric acid is .5 gallons per minute to add all of the acid required. **SUGGESTION:** RAMP THE ACID ADDITION FROM VERY SLOW IN THE BEGINNING TO INCREASING THE GPM FOR ADDITIONAL % VOLUME INCREMENTS. START AT .25 GPM FOR THE FIRST ACID ADDITION TREATMENT. WHEN THE PH STARTS TO DECREASE THEN THE ACID ADDITION CAN BE INCREASED. WHEN THE PH REACHES A PH OF 11.0 SU THEN SLOWLY INCREASE THE ACID ADDITION TO .5 GPM. MONITOR THE PRESSURE AND TEMPERATURE OF THE TREATMENT TANK CAREFULLY. Monitor the pH of the reaction vessel. When the pH of the tank is at a 10 pH or lower the acid addition ramp can be increased above the .5 gpm. MONITOR THE TEMPERATURE; IF THE VESSEL IS TOO HOT THEN THE ACID ADDITION RAMP CANNOT BE INCREASED. Just like in step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. The gallons of 93% sulfuric acid required to treat this material varies by volume. This volume will vary from 2% up to as high as over 7% by volume of the material to be treated. The closer the pH of the treatment vessel gets to a pH of 7.5 the faster the pH will drop to the 5 pH range with just a small amount of acid added. AT THIS POINT OF TREATMENT CATCH A SAMPLE OFTEN FOR PH TESTING TO MAKE SURE THE PH DOES NOT GO BELOW A 4.5. **THE PH TARGET FOR PH TREATMENT IS 4.5** (3.5-5.5). When the pH target point is reached catch a sample and test it for the presence of sulfides and mercaptans. **The sulfide content must be less than 3 ppm and at the target pH the sulfides will be driven off as a gas. If there are sulfides still present at the pH of 4.5 greater than 3 ppm then continue the agitation and head space scrubbing of the material in the treatment vessel into the caustic NASH scrubber.** ***The sulfides at the target pH will be driven off to the***

scrubber; this may just take a little more mixing time. **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 4.5 pH, 3.5 – 5.5 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. ADD 17 GALLONS OF FERRIC CHLORIDE **Ferric Chloride** addition. Add a total volume of ferric chloride to be **.4 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. ADD 40 GALLONS OF LIME, for this treat to remove the very dark red color on the water target for a pH of 9.0 (approximately, 1.5% of the received volume of SIB), gradually add lime and check the pH and color until you reach the target pH (if you see a good light rose color before reaching the target pH STOP at this point, the lime addition can be considered complete. **Lime** addition. Add a total volume of a well mixed lime slurry solution to be **1.5 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. **ADD SLOWLY** [*check the pH of the reaction vessel during the lime additions to make sure the target pH of 8.5 - 9.0 is not over shot, as mentioned above to remove the dark red color the lime addition may be able to stop the lime addition prior to the entire volume being added.* **The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.** Proceed to step 5.

E

41,520

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4-17-08 **JOB Number (or other type of information):** Trailer 638035 JVS 62246

Customer, Product Description, Other Information

PRODUCT : SIB

Product Physical Characteristics			
Density (S.G.)	~~Boiling Point (F,C)~~ pH	Sulfide	Mercaptan
1.34	12.43	37,660	0

OTHER INFORMATION: total mls = 400

11.18 #/gal

$\frac{300}{29.2} = \frac{749.2}{4} = \boxed{187.3}$

STARTING VOLUME: 400 ml

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION		

PROCESSING NOTES:

80%

30% H_2O_2 120 ml pH ~ 10

50% H_2O 200 ml

Acid (Need ~ ~~8%~~) = ~~32 ml~~ 7.3%

5 ml

(10) 5 ml pH = 9.5 Sludge starts forming.
(14 ml heavy sludge building - forming)

7.3%

~~5 ml~~ pH = 9.5 Quite a bit of Solids - Sludge form and foams heavy.
16 ml - Heavy Sludge

(20) 5 ml pH = 9.0

(25) 5 ml pH = 7.2
26 ml - Foaming slows
27 ml slows a lot

(29.2) 4.2 (4.2 ml pH = 4.5

~~Ferric .4~~
Lime 4 to a pH 8.0-8.5

SLOW

pg. 25

Product Processing Log Sheet, Edited Master, 3-21-2008

GRP

EPAHO113001414

E1

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4-17-08 JOB Number (or other type of information): ____________

Customer, Product Description, Other Information

PRODUCT : ____________

Product Physical Characteristics			
Density (S.G.)	Boiling Point (F,C)		

OTHER INFORMATION:

STARTING VOLUME: ____________

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION		

H_2O_2, Water, Acid

PROCESSING NOTES:

1
2 Ferric: ~~2ml~~
3 ~~3ml~~ .5ml
4
5 Lime
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21

EPAHO113001415

B

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4-17-08 JOB Number (or other type of information):

Customer, Product Description, Other Information

PRODUCT :

Product Physical Characteristics			
Density (S.G.)	Boiling Point (F,C)		

OTHER INFORMATION:

STARTING VOLUME: 100 ml

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION		
	ROSE	
	Little Solids	

H_2O_2 + Acid + (50%) NaOH + ~~[illegible]~~ + ~~[illegible]~~
Water

PROCESSING NOTES:

1
2 ① H_2O_2 30 ml pH = 10 30%
3 Water 50 ml 50%
4 ② Acid 5 ml pH = 9
5 2 ml pH = 7.8 8%
6 1 ml pH = 4.5
7 ③ NaOH .4 ml pH = 4.5
8 50% .6 ml pH = 6.0
9 .3 ml pH = 7.0
10 .2 ml pH = 9.0
11
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14
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20
21

Product Processing Log Sheet, Edited Master, 3-21-2008 GRP

EPAHO113001416

C

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4-17-08 JOB Number (or other type of information): ____________

Customer, Product Description, Other Information

PRODUCT : ____________

Product Physical Characteristics			
Density (S.G.)	Boiling Point (F,C)		

OTHER INFORMATION:

STARTING VOLUME: ____________

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION		
	ROSE	

B+ Ferric chloride

1 PROCESSING NOTES:
2 $\boxed{\text{75 mls}}$
3 Ferric = .07ml pH = 6.5
4
5
6
7
8
9
10
11
12
13
14
15
16
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21

EPAHO113001417

D

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4·17·08 **JOB Number (or other type of information):** ______

Customer, Product Description, Other Information

PRODUCT : ______

Product Physical Characteristics			
Density (S.G.)	Boiling Point (F,C)		

OTHER INFORMATION:

STARTING VOLUME: ______

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
			1
			2
			3
	DARK		4
			5
			6
			7
			8
			9
			10
			11
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			13
			14
			15
			16
			17
			18
			19
			20
			21

B+ Ferrous Cl

PROCESSING NOTES:

75 mls

$FeCl_2$ - .17 ml pH = 7.0

I A

CES Environmental Services, Inc.

Ferrous Sulfate
Ferric Chloride

PRODUCT PROCESSING DATA REPORT

Date: 4-16-08 **JOB Number (or other type of information):**

Customer, Product Description, Other Information

PRODUCT :

Product Physical Characteristics			
Density (S.G.)	~~Boiling Point (F,C)~~ Sulfides	pH	
1.34	3.766% H_2S	12.43	

STARTING VOLUME: 100 ml

OTHER INFORMATION:

24% 50% Water

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION		
	ROSE	
	LOB of Solids	

Beaker

MEASURE TEMP

PROCESSING NOTES:

10ml 1. Add 10% H_2O_2 (at a 10% Soln) 76°F → 102 F
10ml

MEASURE TEMP

2. Add Acid to a pH of 4.5 93°F
ml: ✓ (Sml) pH = 8.30 135
✓ 1ml pH ~ 8.08 120
✓ 1ml pH = 6.69 117

~~Reach~~ Reach pH 4.5: Sulfides =

At pH 4.5 Sulfides should be < 3 ppm

8ml
0.096% 1ml pH 3.50 117
0.191% Mercap

-358.4 mV there is no H_2S

Lime 22

Ferric .1 ml

Poly

Product Processing Log Sheet, Edited Master, 3-21-2008

GRP

EPAHO113001419

SIB Hazardous Wastewater TREATMENT PROCESSING

4-15-2008

The material is received in varying gallon (pound) loads

pH= 11.9 – 12.5, density 1.15 – 1.35

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK. The SIB material has a density that varies. When the density is determined this value can be used to determine the gallons of material to be tested. Multiply the density by 8.345 to determine the pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. Divide the pounds received by the calculated pounds per gallon value obtained to determine the total gallons received.

1. The first step of the treatment process is treatment with a 10% concentration of Hydrogen Peroxide. The required amount of the 10% Hydrogen Peroxide treatment chemical is *60%* by volume of the received material. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.** This rate may need to be slowed down. **During this part of the treatment process the temperature can reach as high as 120 degrees F.** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the

reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. <u>**The acid treatment pH target point is a pH of 4.5 su (+/- 1 pH su, 3.5 – 5.5).**</u> When this pH has been reached then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a VERY slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. This is very important. <u>During this part of the treatment process there is also an exotherm that can reach as high as 150 degrees F and higher.</u> Also during this acid part of the treatment process there is the formation of salt solids. The solid formation starts forming slightly at the start of acid addition and continues to increase through the acid treatment step. The solids when first formed are soft and have a tendency to stick to one another and form clumps. With continued agitation during treatment the solids harden and break up. <u>**At this stage of treatment there is an increased rate of degassing and pressure in the tank with the volume of gasses going to the scrubbers increasing.**</u> <u>THE **CRITICAL ISSURE** DURING THIS PHASE OF TREATMENT IS THE **PRESSURE** FORMED BY THE RELEASE OF GASES FORMED FROM THE MATERIAL REACTION WITH ACID AND **CAPTURING** OF THESE GASSES IN THE CAUSTIC NASH TANK.</u> These gas vapors are flammable, odorous and toxic and must be controlled. The addition rate of the concentrated sulfuric acid is .5 gallons per minute to add all of the acid required. **SUGGESTION:** <u>RAMP THE ACID ADDITION FROM VERY SLOW IN THE BEGINNING TO INCREASING THE GPM FOR ADDITIONAL % VOLUME INCREMENTS. START AT .25 GPM FOR THE FIRST ACID ADDITION TREATMENT. WHEN THE PH STARTS TO DECREASE THEN THE ACID ADDITION CAN BE INCREASED. WHEN THE PH REACHES A PH OF 11.0 SU THEN SLOWLY INCREASE THE ACID ADDITION TO .5 GPM. MONITOR THE PRESSURE AND TEMPERATURE OF THE TREATMENT TANK CAREFULLY.</u> Monitor the pH of the reaction vessel. When the pH of the tank is at a 10 pH or lower the acid addition

ramp can be increased above the .5 gpm. MONITOR THE TEMPERATURE; IF THE VESSEL IS TOO HOT THEN THE ACID ADDITION RAMP CANNOT BE INCREASED. Just like in step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. The gallons of 93% sulfuric acid required to treat this material varies by volume. This volume will vary from 2% up to as high as over 7% by volume of the material to be treated. The closer the pH of the treatment vessel gets to a pH of 7.5 the faster the pH will drop to the 5 pH range with just a small amount of acid added. AT THIS POINT OF TREATMENT CATCH A SAMPLE OFTEN FOR PH TESTING TO MAKE SURE THE PH DOES NOT GO BELOW A 4.5. **THE PH TARGET FOR PH TREATMENT IS 4.5** (3.5-5.5). When the pH target point is reached catch a sample and test it for the presence of sulfides and mercaptans. The sulfide content must be less than 3 ppm. If there are sulfides still present at the pH of 4.5 greater than 3 ppm then continue the agitation and head space scrubbing of the material in the treatment vessel into the caustic NASH scrubber. The sulfides will be driven off to the scrubber; this will just take a little time. Sample and test about every 20 minutes for sulfides. Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 4.5 pH, 3.5 – 5.5 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. Ferric Chloride addition. Add a total volume of ferric chloride to be .4% by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. Lime addition. Add a total volume of a well mixed lime slurry solution to be 4-5% by volume of the initial volume of the SIB material pumped into the treatment vessel. **ADD SLOWLY [check the pH of the reaction vessel during the lime additions to make sure the target pH of 9.0 is not over shot].** Proceed to step 5.

5. Plant polymer addition. Add a total volume of a well mixed plant polymer solution to be in the .3 - .5 % by volume of the initial volume of the SIB material pumped into the treatment vessel. ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Make sure the sample caught is representative of the treated material in the tank. There will be quite a bit of solids that have formed in the treatment steps performed above. Make

sure the sample has been treated properly and will process through the filter press [THERE WILL BE A LOT OF SOLIDS, ABOUT 39%). Test for pH, sulfides, mercaptans, TOC and metals. Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

(A)

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4-17-08 JOB Number (or other type of information):

Customer, Product Description, Other Information

PRODUCT :

Product Physical Characteristics			
Density (S.G.)	Boiling Point (F,C)		

OTHER INFORMATION:

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION		

Acid - H_2O_2 Ferric ~~[illegible]~~ Lime Poly

PROCESSING NOTES:

- ACID: 6ml pH=9
  2ml pH=6
- water 50ml
- H_2O_2 30 ml (10)
  (10)
  10 pH= 7
- Acid: .3ml pH= 5.5
  .5ml pH = 4.5
- Ferric 4ml pH = 5.5 Grey
- Lime 4ml RED pH= 7.8

Acid .5ml Green pH= 6.0

Poly .75

Batch 1

Trailer 270

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4-11-08 **JOB Number (or other type of information):** Treated SIB - 2nd treat

Customer, Product Description, Other Information

PRODUCT :

Product Physical Characteristics			
Density (S.G.)	**Boiling Point (F,C)**		

OTHER INFORMATION:

STARTING VOLUME: 100

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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			20
			21

11.04

pH = 10.99

PROCESSING NOTES:

.2 ml Ferric 10.99

H_2SO_4: .26 pH = 4.45

Lime : 3ml pH = 12.01

Poly. .2ml

O&D

SIB Hazardous Wastewater TREATMENT PROCESSING

4-19-2008

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 62247

Manifest Number: 004014605 JJK

Trailer Number: 255

Gallons: 4,264

pH= 12.54 , density = 1.33

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK. The SIB material has a density that varies. When the density is determined this value can be used to determine the gallons of material to be tested. Multiply the density by 8.345 to determine the pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. Divide the pounds received by the calculated pounds per gallon value obtained to determine the total gallons received.

1. **1,279 gallons of 10% CONCENTRATION hydrogen peroxide, 2,132 gallons of water. ADD THE PEROXIDE AND WATER AT THE SAME**

TIME. The first step of the treatment process is treatment with a 10% concentration of Hydrogen Peroxide and 50% by volume of water. The required amount of the 10% Hydrogen Peroxide treatment chemical is __% by volume of the received material. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.** This rate may need to be slowed down. **During this part of the treatment process the temperature can reach as high as 120 degrees F.** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. **ADD 298 GALLONS OF SULFURIC ACID (ADD SLOWLY, A sludge will start to form around a pH of 9.5 but it will mix in and become a solid..** The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. **The acid treatment pH target point is a pH of 4.5 su (+/- 1 pH su, 3.5 – 5.5).** When this pH has been reached then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a VERY slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. This is very important. During this part of the treatment process there is also an exotherm that can reach as high as 150 degrees F and higher. Also during this acid part of the treatment process there is the formation of salt solids. The solid formation starts forming slightly at the start of acid addition and continues to increase through the acid treatment step. The solids when

first formed are soft and have a tendency to stick to one another and form clumps. With continued agitation during treatment the solids harden and break up. **At this stage of treatment there is an increased rate of degassing and pressure in the tank with the volume of gasses going to the scrubbers increasing.** THE **CRITICAL ISSURE** DURING THIS PHASE OF TREATMENT IS THE **PRESSURE** FORMED BY THE RELEASE OF GASES FORMED FROM THE MATERIAL REACTION WITH ACID AND **CAPTURING** OF THESE GASSES IN THE CAUSTIC NASH TANK. These gas vapors are flammable, odorous and toxic and must be controlled. The addition rate of the concentrated sulfuric acid is .5 gallons per minute to add all of the acid required. **SUGGESTION:** RAMP THE ACID ADDITION FROM VERY SLOW IN THE BEGINNING TO INCREASING THE GPM FOR ADDITIONAL % VOLUME INCREMENTS. START AT .25 GPM FOR THE FIRST ACID ADDITION TREATMENT. WHEN THE PH STARTS TO DECREASE THEN THE ACID ADDITION CAN BE INCREASED. WHEN THE PH REACHES A PH OF 11.0 SU THEN SLOWLY INCREASE THE ACID ADDITION TO .5 GPM. MONITOR THE PRESSURE AND TEMPERATURE OF THE TREATMENT TANK CAREFULLY. Monitor the pH of the reaction vessel. When the pH of the tank is at a 10 pH or lower the acid addition ramp can be increased above the .5 gpm. MONITOR THE TEMPERATURE; IF THE VESSEL IS TOO HOT THEN THE ACID ADDITION RAMP CANNOT BE INCREASED. Just like in step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. The gallons of 93% sulfuric acid required to treat this material varies by volume. This volume will vary from 2% up to as high as over 7% by volume of the material to be treated. The closer the pH of the treatment vessel gets to a pH of 7.5 the faster the pH will drop to the 5 pH range with just a small amount of acid added. AT THIS POINT OF TREATMENT CATCH A SAMPLE OFTEN FOR PH TESTING TO MAKE SURE THE PH DOES NOT GO BELOW A 4.5. **THE PH TARGET FOR PH TREATMENT IS 4.5** (3.5-5.5). When the pH target point is reached catch a sample and test it for the presence of sulfides and mercaptans. The sulfide content must be less than 3 ppm. If there are sulfides still present at the pH of 4.5 greater than 3 ppm then continue the agitation and head space scrubbing of the material in the treatment vessel into the caustic NASH scrubber. The sulfides will be driven off to the scrubber; this will just take a little time. Sample and test about every 20 minutes for sulfides. Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 4.5 pH, 3.5 – 5.5 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. **<u>ADD 6 GALLONS OF FERRIC CHLORIDE</u>** **<u>Ferric Chloride</u>** addition. Add a total volume of ferric chloride to be **<u>.4 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. **<u>ADD 85 GALLONS OF LIME</u>** **<u>Lime</u>** addition. Add a total volume of a well mixed lime slurry solution to be **<u>2 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. **<u>ADD SLOWLY [check the pH of the reaction vessel during the lime additions to make sure the target pH of 8.5 - 9.0 is not over shot].</u>** Proceed to step 5.

5. **<u>ADD 11 GALLONS OF POLYMER</u>** **Plant polymer** addition. Add a total volume of a well mixed plant polymer solution to be in the **<u>.25 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Make sure the sample caught is representative of the treated material in the tank. There will be quite a bit of solids that have formed in the treatment steps performed above. Make sure the sample has been treated properly and will process through the filter press [THERE WILL BE A LOT OF SOLIDS, ABOUT 39%). Test for pH, sulfides, mercaptans, TOC and metals (also ammonia which can be as high as 5,000 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **<u>The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.</u>** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

SIB- Defoamer

4-22-08

ASAP

255

- 100 ml SIB
- 10 ml 10% conc H_2O_2
- 1 ml Defoamer
- 5 ml Add Acid (H_2SO_4) about 8% by volume slowly

? = Does heavy foam Sludge form on top

MILES

Gary Peterson

From: Gary Peterson
Sent: Saturday, April 19, 2008 2:31 PM
To: Marlin Moser; Bo Cumberland
Cc: Matt Bowman; Brian Weathers
Subject: SIB Trailer 255 Processing, 4-19-2008
Attachments: SIB, BATCH TRAILER 255 with the GENERAL Treatment Processing, 4-19-2008.doc

Trailer 255 processing for Saturday or Sunday is attached. This is the next trailer to process. This processed exactly like the last batch, trailer 638035. The chemical usage is just slightly different.

Please arrange to back trailer 124221-1 or LT-638 into the bay and sample the container (pull 3 quarts and label them please). Both of these trailers were received on 4-14-2008 and are next in line for processing.

A printed copy of this sheet will be placed on the tote near the SIB processing tank. All gallons for processing will be highlighted in yellow.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

Tracking:

Recipient	Delivery	Read
Marlin Moser	Delivered: 4/19/2008 2:31 PM	Read: 4/19/2008 2:32 PM
Bo Cumberland	Delivered: 4/19/2008 2:31 PM	Read: 4/21/2008 6:41 AM
Matt Bowman	Delivered: 4/19/2008 2:31 PM	
Brian Weathers	Delivered: 4/19/2008 2:31 PM	

4-17-08
Treatment

ISO #
638035

SIB Hazardous Wastewater TREATMENT PROCESSING

41,520 #'s

4-15-2008

The material is received in varying gallon (pound) loads

3,714 gallons

pH= 11.9 – 12.5, density 1.15 – 1.35

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK. The SIB material has a density that varies. When the density is determined this value can be used to determine the gallons of material to be tested. Multiply the density by 8.345 to determine the pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. Divide the pounds received by the calculated pounds per gallon value obtained to determine the total gallons received.

H_2O_2 + Water
30% of 10% H_2O_2
50% of Water

1. The first step of the treatment process is treatment with a 10% concentration of Hydrogen Peroxide. The required amount of the 10% Hydrogen Peroxide treatment chemical is *60%* by volume of the received material. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.** This rate may need to be slowed down. **During this part of the treatment process the temperature can reach as high as 120 degrees F.** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the

30% of 10% Conc. of Peroxide = 1,114 gallons Peroxide
50% Vol of Water = 1,857 gallons Water
(Add together)

reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

ACID ADD SLOWLY at a pH around 10 a top sludge starts forming.

2. The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. **The acid treatment pH target point is a pH of 4.5 su (+/- 1 pH su, 3.5 – 5.5).** When this pH has been reached then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a VERY slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. This is very important. During this part of the treatment process there is also an exotherm that can reach as high as 150 degrees F and higher. Also during this acid part of the treatment process there is the formation of salt solids. The solid formation starts forming slightly at the start of acid addition and continues to increase through the acid treatment step. The solids when first formed are soft and have a tendency to stick to one another and form clumps. With continued agitation during treatment the solids harden and break up. **At this stage of treatment there is an increased rate of degassing and pressure in the tank with the volume of gasses going to the scrubbers increasing.** THE **CRITICAL ISSURE** DURING THIS PHASE OF TREATMENT IS THE **PRESSURE** FORMED BY THE RELEASE OF GASES FORMED FROM THE MATERIAL REACTION WITH ACID AND **CAPTURING** OF THESE GASSES IN THE CAUSTIC NASH TANK. These gas vapors are flammable, odorous and toxic and must be controlled. The addition rate of the concentrated sulfuric acid is .5 gallons per minute to add all of the acid required. **SUGGESTION:** RAMP THE ACID ADDITION FROM VERY SLOW IN THE BEGINNING TO INCREASING THE GPM FOR ADDITIONAL % VOLUME INCREMENTS. START AT .25 GPM FOR THE FIRST ACID ADDITION TREATMENT. WHEN THE PH STARTS TO DECREASE THEN THE ACID ADDITION CAN BE INCREASED. WHEN THE PH REACHES A PH OF 11.0 SU THEN SLOWLY INCREASE THE ACID ADDITION TO .5 GPM. MONITOR THE PRESSURE AND TEMPERATURE OF THE TREATMENT TANK CAREFULLY. Monitor the pH of the reaction vessel. When the pH of the tank is at a 10 pH or lower the acid addition

7.3%

277 gallons

ADD SLOWLY

ramp can be increased above the .5 gpm. MONITOR THE TEMPERATURE; IF THE VESSEL IS TOO HOT THEN THE ACID ADDITION RAMP CANNOT BE INCREASED. Just like in step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. The gallons of 93% sulfuric acid required to treat this material varies by volume. This volume will vary from 2% up to as high as over 7% by volume of the material to be treated. The closer the pH of the treatment vessel gets to a pH of 7.5 the faster the pH will drop to the 5 pH range with just a small amount of acid added. AT THIS POINT OF TREATMENT CATCH A SAMPLE OFTEN FOR PH TESTING TO MAKE SURE THE PH DOES NOT GO BELOW A 4.5. **THE PH TARGET FOR PH TREATMENT IS 4.5** (3.5-5.5). When the pH target point is reached catch a sample and test it for the presence of sulfides and mercaptans. The sulfide content must be less than 3 ppm. If there are sulfides still present at the pH of 4.5 greater than 3 ppm then continue the agitation and head space scrubbing of the material in the treatment vessel into the caustic NASH scrubber. The sulfides will be driven off to the scrubber; this will just take a little time. Sample and test about every 20 minutes for sulfides. Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 4.5 pH, 3.5 – 5.5 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

15 gallons

Ferric

3. Ferric Chloride addition. Add a total volume of ferric chloride to be .4% by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

148 gallons – Add SLOWLY – TARGET pH is 8.0-8.5

LIME

4. Lime addition. Add a total volume of a well mixed lime slurry solution to be 4-5% by volume of the initial volume of the SIB material pumped into the treatment vessel. **ADD SLOWLY [check the pH of the reaction vessel during the lime additions to make sure the target pH of 9.0 is not over shot].** Proceed to step 5.

9 gallons

POLY

5. Plant polymer addition. Add a total volume of a well mixed plant polymer solution to be in the .3 - .5 % by volume of the initial volume of the SIB material pumped into the treatment vessel. ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Make sure the sample caught is representative of the treated material in the tank. There will be quite a bit of solids that have formed in the treatment steps performed above. Make

sure the sample has been treated properly and will process through the filter press [THERE WILL BE A LOT OF SOLIDS, ABOUT 39%). Test for pH, sulfides, mercaptans, TOC and metals. Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

#3

SIB Hazardous Wastewater TREATMENT PROCESSING

4-14-2008

ISO CONTAINER: GSIU 124223-2 (JOB NUMBER 62045), 4,320 GALLONS

pH= 12.2, density 1.34

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK

1. The first step of the treatment process is treatment with a 10% concentration of Hydrogen Peroxide **[2,432 GALLONS of 10% conc. peroxide].** The required amount of the 10% Hydrogen Peroxide treatment chemical is *60.10%* by volume of the received material. The SIB material has a density right at 1.34. This is 11.18 pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.** This rate may need to be slowed down. **During this part of the treatment process the temperature can reach as high as 120 degrees F.** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. The treatment pH target point is a pH of 4.5 su (+/- 1 pH su, 3.5 – 5.5). When this pH has been reached then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a VERY slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. **The initial target volume for the concentrated sulfuric acid addition is 7.5% by volume. The addition rate gpm of this material is required to be added at a precisely controlled rate [324 GALLONS of 93% conc. Sulfuric acid].** This is very important. During this part of the treatment process there is also an exotherm that can reach as high as 150 degrees F and higher. **At this stage of treatment there is an increased rate of degassing and pressure in the tank with the volume of gasses going to the scrubbers increasing.** THE **CRITICAL ISSURE** DURING THIS PHASE OF TREATMENT IS THE **PRESSURE** FORMED BY THE RELEASE OF GASES FORMED FROM THE MATERIAL REACTION WITH ACID AND THE CAPTURING OF THESE GASSES IN THE CAUSTIC NASH TANK. These gas vapors are also odorous and toxic and must be controlled. The addition rate of the concentrated sulfuric acid is .5 gallons per minute to add all of the acid required. **SUGGESTION:** RAMP THE ACID ADDITION FROM VERY SLOW IN THE BEGINNING TO INCREASING THE GPM FOR ADDITIONAL % VOLUME INCREMENTS. START AT .25 GPM FOR THE FIRST 25% OF NEEDED ACID VOLUME **[81 GALLONS]**. THEN INCREASE TO .5 GPM FOR THE NEXT ADDITIONAL 25% OF NEEDED VOLUME **[81 GALLONS]**. MONITOR THE PRESSURE AND TEMPERATURE OF THE TREATMENT TANK CAREFULLY. AT THIS POINT CHECK THE pH OF THE TREATMENT VESSEL (at this point 50% by volume of the required acid should have been added to the tank). When the pH of the tank is at a 10 pH or lower the acid addition ramp can be increased slightly above the .5 gpm. MONITOR THE TEMPERATURE; IF THE VESSEL IS TOO HOT THEN THE ACID ADDITION RAMP CANNOT BE INCREASED. Just like in step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate,

pressure buildup and the rise in temperature exotherm. The required gallons to treat this load are approximately 7.5% by volume. When 6% by volume of the acid has been added (256 gallons of sulfuric acid) sample the vessel and test for pH. Prior to catching the sample let the vessel mix for a short while (about 10 minutes) to make sure the last acid addition has reacted and that the sample caught is very representative of the treatment vessel. The closer the pH of the treatment vessel gets to a pH of 7.5 the faster the pH will drop to the 5 pH range with just a small amount of acid added. AT THIS POINT OF TREATMENT CATCH A SAMPLE OFTEN FOR PH TESTING TO MAKE SURE THE PH DOES NOT GO BELOW A 4.5. When the last gallon of acid per the 7.5% by volume (OR POSSIBLY LESS) has been added let the reaction vessel mix and agitate for about 10 minutes before catching a sample from the vessel for checking for pH and for titration. THE PH TARGET AT THIS POINT OF TREATMENT IS 4.5 (3.5-5.5). As mentioned above if there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. Also during this part of the treatment process this is the formation of solids. The solids formation starts forming a little at the start of acid addition and continues to increase through this acid treatment step. The solids when first formed are soft and have a tendency to stick to one another and form clumps. With continued agitation during treatment the solids harden and break up. Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 4.5 pH, 3.5 – 5.5 pH su, 3 ppm sulfides and small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. Ferric Chloride addition. Add a total volume of ferric chloride to be .4% by volume of the initial volume of the SIB material pumped into the treatment vessel. **[17.3 GALLONS of plant ferric chloride].** Proceed to step 4.

4. Lime addition. Add a total volume of a well mixed lime slurry solution to be 4-5% by volume of the initial volume of the SIB material pumped into the treatment vessel. **ADD SLOWLY [check the pH of the reaction vessel during the lime additions to make sure the target pH of 9.0 is not over shot]. [173 gallons of plant lime and possibly less].** Proceed to step 5.

5. Plant polymer addition. Add a total volume of a well mixed plant polymer solution to be .5 % by volume of the initial volume of the SIB material pumped into the treatment

vessel. ADD SLOWLY. **[22 GALLONS of plant polymer].** Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Make sure the sample caught is representative of the treated material in the tank. There will be quite a bit of solids that have formed in the treatment steps performed above. Make sure the sample has been treated properly and will process through the filter press [THERE WILL BE A LOT OF SOLIDS, ABOUT 39%). Test for pH, sulfides, mercaptans, TOC and metals. Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

gallons #2
4,320

CES Environmental Services, Inc.

51.3798
37.9802
13.3996
1.34

PRODUCT PROCESSING DATA REPORT

Date: 4-11-08 JOB Number (or other type of information): ISO: 124223-2 (62045)

Customer, Product Description, Other Information

PRODUCT : SIB

profile 2696

Product Physical Characteristics			
Density (S.G.)	Boiling Point (F,C)	pH	
1.34	#gal 11.18	12.15 (w/H2O 12.28)	

OTHER INFORMATION: 4,320 gallons
H_2S = 35,040 ppm
Mercap = 2,300 ppm

STARTING VOLUME: 100 ml

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
			1
		~~432 gal~~ 10%	2
			3
			4
			5
		324 gallons 7.5%	6
			7
		4%	8
		~~173 gal~~	9
		173 Lime	10
			11
		22 gal	12
			13
			14
			15
			16
			17
			18
			19
			20
			21

PROCESSING NOTES:
(1) H_2O_2: 10% (10ml) 10% concentration (6 gpm) exo = 116°F est. 120°F pH=
(2) Acid: % by Volume? (VAS 63)
- 5ml 145°F lots of pressure pH: 9.43
- 2ml (ST-123F) → 136°F pH= 6.48
- .5ml (ST-125°F) → 124° No↑ pH = 4.18 (4.72)
⊖ H_2S 2,370 mercaptan
(3) Ferric: ~~5ml~~ .4ml pH: 4.08
(4) Lime: 4ml (5ml) pH - 9.6 Add slow
(5) Poly .5ml Final 12.40 pH
% SBV 39%

Product Processing Log Sheet, Edited Master, 3-21-2008 GRP

EPAHO113001441

Driver Sign In / Out Sheet

	Date	Time In	Time Out	Manifest #	Trailer #	On The Line	Company	Driver	What tk it is in
1	04-14	2:05		4014595	217		CES	[illegible]	
2	04-14	200		4014593	259		CES	[illegible]	
3	4-14	1415			374		FIREBIRD	E Roach	
4	4/14	1500		4014618	206		OEG	[illegible]	
5	4/14	3:30		62053	241		CES	[illegible]	Flammable liq
6	4/14	345		4014609		✓	CES	F RIVERS	S/Blaste
7	4-14	4:05		4014620	107	✓	CES	HERNANDEZ	SLUDGE
8	4-14	4:40		4014619	228		CES	[illegible]	w/w
9	4-14	520		62032			CES	[illegible]	
10	4/14/08	7:30		004017578	8177		CES	[illegible]	w/water
11	4/14/08	8:20		401 4588	263		CES	[illegible]	W/water
12	4-14	20:20		404600	239		CES	[illegible]	
13	4-15-08	8:30		4014623	232		CES	J Espinal	caustic
14	4-15-08	9:35		600059997	86019		F.T.L.	BEN ROSS	
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									

Driver Sign In / Out Sheet

	Date	Time In	Time Out	Manifest #	Trailer #	On The Line	Company	Driver	What tk/it is in
1	4-11	1820		4014585	105		CES	[illegible]	@M/waste
2	4-11	630		4014584	259		CES	Kristen	
3	4/11	631		4014536	243		CES	[illegible]	ALC/water
4	4/11	7:00		62084	263	✓	CES	Brent	
5	4/11	7:28		62067	241	✓	CES	F. Villalta	W/W
6	4/11/08	8:15		62083	277	✓	CES.	Benjamin Mata	w/w
7	4/11	6:00		61928	205		CES	D. T	w/w
8	4/12	9:10		4584	232		CES	PETER SEMIEN	CAUSTIC
9	4/12	10:00		61927	243		CES	D. T	w/w
10	4/12	10:30		[illegible]	4[illegible]	—	CES	[illegible]	W/W
11	4-12	10:35		4014603	104	—	CES	Hernandez	o/water
12	4-12	1115		4014581	259		CES	Kristen	W
13	4.12	12:35		4014612	241		CES	Luis	W/W
14	4/12	1:25		4588	232		CES	T. SEMIEN	CAUSTIC
15	4-12	4:55		62191	6731		CES	B. Sitting	
16	4-12-08	8:10		62192	265		CES	[illegible]	Caustic
17	4/14	9:30		62054	241		CES	T. Semien	Flammable liq
18	4-14	10:00		4014590	102		CES	HERNANDEZ	SLUDGE
19	4/14-08	10:15		62025	265		CES	Candido	CousTick
20	4-14-08	10:30			249		Beeline	Daniel A	Caustics
21	4-14-08	1055		4014592	259		CES	Kristen	
22	4/14	11:15		4014599	205		CES	D. T	w/w
23	4/14	1230		62247	255	✓	CES	F Villalta	W/W
24	4/14	100			124121	✓	CES	Flad B	S/B
25	4/14	100			124238	✓	CES	Flad Ba	S/B
26	4/14	1315		4014598	252		CES	Hickman	W/W
27	4/14/08	1:30		4014589	271	✓	CES.	Benjamin Mata.	W/WT.

EPAHO113001443

#1

CES Environmental Services, Inc.

34,400 #
10.71 #/gal
3,212 gal.

PRODUCT PROCESSING DATA REPORT

Date: 4-8-08 JOB Number (or other type of information): 2nd

Customer, Product Description, Other Information 61849

PRODUCT: AMCU ~~6~~38035

Scrubber (46ml 1st Batch) 54 ml now
(100 m 152 NaOH)

Product Physical Characteristics			
Density (S.G.)	Boiling Point (F,C)		
1.284			

STARTING VOLUME: 100 ml SIB

OTHER INFORMATION:
H_2O_2: 60%, Acid ~~5 3/4%~~ 6 3/4%, Ferric .5% 1%, lime 10%, poly 1%

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION		
FINAL TESTING		
Solids = 12%		
TOC - 2,411		
Metals:		
pH:		

PROCESSING NOTES: 60% H_2O_2 (10% conc.)

1 ① H_2O_2: (3:35pm) - 6ml (30sec); 6ml (30sec)
2 6ml, 6ml, 6ml, 6ml (starting to splatter
3 T = 165°F, (4 X faster than plant gpm)
4 6ml; 6ml, 6ml, 6ml = 60 ml 180°F
5 H_2O_2 is the exothermic reaction

6 ACID: 4:10 2ml → 4:25 - Solids forming
7 ② 2ml - More Solids (white creamy splattering
8 on vessel walls

6 6 6 6 6 6 6 6 6 6 (36) (48) (60)

9 1ml ~~2~~ 1/2 ml = 5 1/2 (at ~5ml the
10 acid reaction is pretty complete.
11 The clumps of solids formed again
12 Acid is the H_2S↑ reaction
13 5 1/2 ml pH = 6.22; another 1/2 ml acid $\boxed{6ml}$
14 6ml - pH = 6.01; ~~6 1/2 ml~~ 6 1/2 ml ~~pH~~ = al
15 6 1/2 ml turned very orangish again pH = 5.49
16 $\boxed{7ml}$ ~~4.~~ 2.55 pH
17 Ferric: 1ml
18
19 Line: 10ml pH = 9.77
20
21 Poly (plant poly mix) 1/2 ml

Product Processing Log Sheet, Edited Master, 3-21-2008

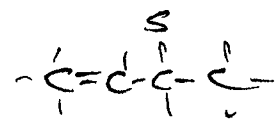
30% ~~12%~~ Solids SBV

0 ppm Sulfide
0 ppm Mercaptan

GRP

EPAHO113001444

CES Environmental Services, Inc.



PRODUCT PROCESSING DATA REPORT

1.3

Date: 3-21-2008 **JOB Number (or other type of information):** 1206

Customer, Product Description, Other Information

PRODUCT : SIB

Product Physical Characteristics			
Density (S.G.)	Boiling Point (F,C)		

SIB

STARTING VOLUME: 100

OTHER INFORMATION:
20 ml 30% H_2O_2 + 40 ml H_2O = 60 ml

PROCESSING INFORMATION

1.76x 53% Solids

30% ~~H_2O_2~~ Solids

SPECIFIC DATA LOG INFORMATION

FINAL:	Solids = 30%		1
Filter Press:	Press is Ok		2 60 ml
"	Wonderful "		3
			4
100 ml	120		5
			6
			7
~~Scrubber Water~~			8
			9
2,440 H_2S			5½ ml 10
0	mer		11
			12
			13
			14
			Sol 15
			16
			17
			18 10 ml
			19
			20
			12 ml 21

PROCESSING NOTES: ①
Peroxide solution added in 30 minutes, temp final was 150°F; peroxide is spent immediately.

② Caustic solution = 0 ppm of Sulfide, the odor is strong (medium)

③ Acid addition 2 mls in 15 min - reaction is moderate No H_2S gasses detected.
pH = 8.5

④ Acid 2 ml more over ≈ 20 min reaction moderate - No odors pH = 6.5

⑤ ½ ml acid over 10 min pH = 6.5

⑥ ½ ml acid over 5 min pH = 6

⑦ ½ ml in 5 min fast. pH = 5.5

⑧ Ferric chloride 6 ml - color change sludge matrix change - color red to green brown black; sludge is has good particulate size.

(10 ml)

⑨ Lime treat 2 ml, + 2 ml, + 2 ml, + 2 ml, 2 ml
pH = 7 odor gone

2 ml, 2 ml (14 ml)

pH = 9.5 - 10

⑩ Poly = ≈ 1 ml

Product Processing Log Sheet, Edited Master, 3-21-2008 GRP

EPAHO113001445

15% NaOH
10% H_2O_2
~90% H_2SO_4

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4-8-08 JOB Number (or other type of information):

Customer, Product Description, Other Information

1st

PRODUCT: ANCU 638035

100 + 322 = 422

100ml NaOH – Scrubber (15% NaOH)

Product Physical Characteristics			
Density (S.G.)	Boiling Point (F,C)	Color	
1.284		Dark Red	

SIB

STARTING VOLUME: 100 ml

OTHER INFORMATION: Start SIB:
1) H_2S = 14,470 ppm
2) Mercaptan 43,500 ppm

1. Peroxide addition – 60 ml
2. Acid Addition – 5 3/4 ml
3. Ferric Cl – (.5) = 1.5 ml
4. Lime
5. Poly

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION		
COST SIB per Gallon		
		xfer Val
Peroxide	$ .75	
~~30% Solids~~		

PROCESSING NOTES: Start 9:55 AM

1) H_2O_2 4ml Beautiful; 6ml OK Fine; 6ml
3ml / 35 sec – Odor = 135 gal/3 sec = 2,700 gpm
6ml – 40 sec OK – diffuser picked up ↑
Slow – 30 sec OK; 8ml 40 sec OK some splattering in vessel 160°F; 8ml – fast 40s some odor; (at the next 6ml [48] started to [illegible]) slight color change 8ml – OK some color change
5ml OK; 5ml OK – Color change Red to a Red Orange: H_2S 9,222 (Test 1); Test 2 9,350
(.3 ml) ~~18,440~~ 3,370 (. 9 ml) 8,600

60ml H_2O_2

2) Acid (5.5ml); 1ml test OK; 2ml fast
Solids generation (2ml 20 sec)
2ml – fast – 5 3/4 ml Acid; 0 ppm H_2S, 1,260 mercaptan
.75ml fast – 2 lge clumps formed pH = 3.67
46ml Caustic (54 ml backed up into reaction vessel)

Scrubber Caustic = 2,440 H_2S
4,880 mercaptan

STOP – No Lime, Ferric, SBV

Product Processing Log Sheet, Edited Master, 3-21-2008 GRP

EPAHO113001446

Gary Peterson

From: Marlin Moser
Sent: Monday, March 31, 2008 5:41 PM
To: Gary Peterson
Subject: FW: SIB Process

4,000 gal. SIB
2,400 gal 10% H_2O_2
220 gal Acid
20 gal Ferris
400 gal Lime

7,040 gal
40 gal poly

7,080 gallons

Answer what you can please. Just on treatment, I'll get the mechanical stuff.

From: Philip Evans [mailto:pevans@wcmgroup.com]
Sent: Monday, March 31, 2008 4:16 PM
To: Marlin Moser
Cc: Connie A. Harrison
Subject: SIB Process

Marlin,

Per our earlier conversation, we need the following data to complete the PBR for the SIB process.

1. Treatment tank dimensions (Height and Diameter)
2. Batch size (gallons of SIB charged per batch)
3. Approximate rate of hydrogen peroxide addition (gpm)
4. Can we assume all the hydrogen peroxide is consumed in the oxidation process so there is little or none remaining in the subsequent steps?
5. Can you approximate the duration of the oxidation and acidification steps?
6. The revised process flow diagram references a number of tanks for storage of the hydrogen peroxide, sulfuric acid, ferric chloride, lime, polymer, and sludge. Are these actual tanks or drums and totes. If tanks, please provide dimensions (height and diameter).
7. What is the transfer rate of the tank contents through the filter press?
8. Please identify the components of the scrubber system header down stream of the diffuser/caustic scrubber tank.

Thanks,
Phil

H_2O_2 rate: $\frac{60 \text{ ml}}{100 \text{ ml}}$ over 60 minutes FAST

8 hours ~ 480 min.

2400 gallon

rate = 5 gpm

Acid 220 gal 6 hours

480

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4-9-08 JOB Number (or other type of information): Plant Batch

Customer, Product Description, Other Information

PRODUCT :

11:30 AM

Product Physical Characteristics			
Density (S.G.)	Boiling Point (F,C)		

OTHER INFORMATION:

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
			1
			2
			3
			4
			5
			6
			7
			8
			9
			10
			11
			12
			13
			14
			15
			16
			17
			18
			19
			20
			21

PROCESSING NOTES:

150 Container Sample: pH = ~~9.92~~ 10.75

Sulfides H_2S = 11,700

Mercaptan = ~~34,070~~

74,910

Batch 1 H_2O_2 treated (~300 gal)

pH = 9.92

H_2S = 15,270

Mer. = 30, 0 mer

9.91 10.58 end

SIB 3,212 gallons

SIB Hazardous Wastewater TREATMENT PROCESSING

PROFILE: 2696

12 drums 2,000 4 totes 500

TREATMENT and HANDLING PROTOCOL

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system.

1. H_2O_2 1. (1,927 gallons)

1. The first step of the treatment process is treatment with a 10% concentration of Hydrogen Peroxide. The required amount of the 10% Hydrogen Peroxide treatment chemical is 60% by volume of the received material. The SIB material has a density right at 1.284. This is 10.71 pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.** This rate may need to be slowed down. During this part of the treatment process the temperature can reach as high as 180 degrees F. The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

(2) Acid (193 gallons)

2. The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. The treatment pH target point is a pH of 4.0 su (+/- 1 pH su, 3 – 5). When this pH has been reached then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides still

present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. **The initial target volume for the concentrated sulfuric acid addition is 6% by volume. The addition rate gpm of this material is required to be added at a precisely controlled rate.** This is very important. During this part of the treatment process there is also a slight exotherm. At this stage of treatment there is an increased rate of degassing and pressuring of the tank with the volume of gasses going to the scrubbers increasing. These vapors are also odorous and must be controlled. The addition rate of the concentrated sulfuric acid .5 gallons per minute. Just like is step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of acid per the 6% by volume has been added let the reaction vessel agitate for approximately 30 minutes before catching a sample from the vessel for checking for pH and for titration. As mentioned above If there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. Continue this until the required pH, sulfide and mercaptan test parameters have been met (3 – 5 pH su, 3 ppm sulfides and small amount of mercaptans, very slight odor). During this part of the treatment process this is the formation of solids. The solids formation start forming a little at the start of acid addition and continue to increase through this acid treatment step. The solids when first formed are soft and have a tendency to

(3) Ferric 32 gallons > 9.0

(4) Lime 321 gallons – Slow (9.8) $\boxed{9-10}$

(5) Poly 32 gallons – Slow

#1

SIB Hazardous Wastewater TREATMENT PROCESSING

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system.

1. The first step of the treatment process is treatment with a 10% concentration of Hydrogen Peroxide. The required amount of the 10% Hydrogen Peroxide treatment chemical is 60% by volume of the received material. The SIB material has a density right at 1.284. This is 10.71 pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.** This rate may need to be slowed down. During this part of the treatment process the temperature can reach as high as 180 degrees F. The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. The treatment pH target point is a pH of 4.0 su (+/- 1 pH su, 3 – 5). When this pH has been reached then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides still

present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into ~~the treatment vessel.~~ **The initial target volume for the concentrated sulfuric acid addition is 6% by volume. The addition rate gpm of this material is required to be added at a precisely controlled rate.** This is very important. During this part of the treatment process there is also a slight exotherm. Also during this part of the treatment process this is the formation of solids. The solids formation start forming a little at the start of acid addition and continue to increase through this acid treatment step. The solids when first formed are soft and have a tendency to stick to one another and form clumps. With continued agitation during treatment the solids harden and break up. At this stage of treatment there is an increased rate of degassing and pressuring of the tank with the volume of gasses going to the scrubbers increasing. These vapors are also odorous and must be controlled. The addition rate of the concentrated sulfuric acid .5 gallons per minute. Just like is step 1 the sulfuric acid addition can ~~be stopped~~ at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of acid per the 6% by volume has been added let the reaction vessel agitate for approximately 30 minutes before catching a sample from the vessel for checking for pH and for titration. As mentioned above if there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. Continue this until the required pH, sulfide and mercaptan test parameters have been met (3 – 5 pH su, 3 ppm sulfides and small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. Ferric Chloride addition. Add a total volume of ferric chloride to be .5% by volume ~~of~~ the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. Lime addition. Add a total volume of a well mixed lime slurry solution to be 10 % by volume of the initial volume of the SIB material pumped into the treatment vessel. ~~ADD~~ SLOWLY. Proceed to step 5.

5. ~~Plant polymer add~~ition. Add a total volume of a well mixed plant polymer solution to be 10 % by volume ~~of~~ the initial volume of the SIB material pumped into the treatment vessel. ADD SLOWLY Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 40 minutes. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Make sure the sample caught is representative of the treated material in the tank. There will be quite a bit of solids that have formed in the treatment steps performed above. Make sure the sample has been treated properly and will process through the filter press. Test for pH, sulfides, mercaptans, TOC and metals. Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system.

8. The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material. This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

Gary Peterson

From: Gary Peterson
Sent: Monday, March 31, 2008 11:16 AM
To: Marlin Moser
Subject: RE: SIB Process

Marlin,

1. Treatment tank dimensions (Height and Diameter). 4,500
2. **Batch size (gallons of SIB charged per batch) : ~~4,000~~ gallons of SIB**
3. **Approximate rate of hydrogen peroxide addition (gpm) : 60% by volume of a 10% hydrogen peroxide solution is reacted with the SIB batch of 4,000 gallons. This is** 2,700 **~~2,400~~ gallons of a 10% H2O2 solution that is added. This oxidizer volume is currently being considered to be added over an 4 hour period. This rate of addition would be 2,400 gallons over 240 minutes which is 10 gpm. This rate may need to be adjusted to be a 6 to 8 hours period which would then be a addition volume rate of 5 to 6.7 gpm.**
4. **Can we assume all the hydrogen peroxide is consumed in the oxidation process so there is little or none remaining in the subsequent steps? YES. However after the last of the hydrogen peroxide solution is added the batch should be allowed to mix and agitate for an additional 45 minutes.**
5. **Can you approximate the duration of the oxidation and acidification steps? The oxidation step is outlined in item 3 plus the additional mixing time of approximately 45 minutes. The acidification step addition rate is an 6 hour addition. The volume of the acid (90 -95% concentration sulfuric acid) is** 248 **~~220~~ gallons. The addition rate of the acid is .5 gpm.** .55
6. The revised process flow diagram references a number of tanks for storage of the hydrogen peroxide, sulfuric acid, ferric chloride, lime, polymer, and sludge. Are these actual tanks or drums and totes. If tanks, please provide dimensions (height and diameter).
7. What is the transfer rate of the tank contents through the filter press?
8. Please identify the components of the scrubber system header down stream of the diffuser/caustic scrubber tank.

(4)(10 gpm) = (6)(x gpm)

$\boxed{6 \text{ gpm}}$

From: Marlin Moser
Sent: Monday, March 31, 2008 5:41 PM
To: Gary Peterson
Subject: FW: SIB Process

Answer what you can please. Just on treatment, I'll get the mechanical stuff.

From: Philip Evans [mailto:pevans@wcmgroup.com]
Sent: Monday, March 31, 2008 4:16 PM
To: Marlin Moser
Cc: Connie A. Harrison
Subject: SIB Process

Marlin,

Per our earlier conversation, we need the following data to complete the PBR for the SIB process.

9. Treatment tank dimensions (Height and Diameter)
10. Batch size (gallons of SIB charged per batch)
11. Approximate rate of hydrogen peroxide addition (gpm)
12. Can we assume all the hydrogen peroxide is consumed in the oxidation process so there is little or none remaining in the subsequent steps?
13. Can you approximate the duration of the oxidation and acidification steps?
14. The revised process flow diagram references a number of tanks for storage of the hydrogen peroxide, sulfuric acid, ferric chloride, lime, polymer, and sludge. Are these actual tanks or drums and totes. If tanks, please provide dimensions (height and diameter).
15. What is the transfer rate of the tank contents through the filter press?
16. Please identify the components of the scrubber system header down stream of the diffuser/caustic scrubber tank.

Thanks,
Phil

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Sent: Monday, March 31, 2008 5:41 PM
To: Gary Peterson
Subject: FW: SIB Process

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Sent: Monday, March 31, 2008 4:16 PM
To: Marlin Moser
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Subject: SIB Process

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2. Batch size (gallons of SIB charged per batch)
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7. What is the transfer rate of the tank contents through the filter press?
8. Please identify the components of the scrubber system header down stream of the diffuser/caustic scrubber tank.

Thanks,
Phil

Gary Peterson

From: Gary Peterson
Sent: Monday, April 14, 2008 2:24 PM
To: Marlin Moser
Subject: SIB Costing Detail Sheet, 1st load 4-8-08 (4-14-2008)
Attachments: SIB, !st Load Processing Waste Cost Data Sheet, 4-14-2008.xls

Marlin,

The cost sheet is attached. There are not any fixed costs included. There is not any extra Labor costs included. The solids cost is for class 1 solids disposal (the solid cost do not include the extra solids generated from the press pre-coat). If the liquids process to system 1 the cost will go up another $.09 per gallon ($.14 - $.05). There will be routine maintenance, replacement of processing equipment, reaction and NASH vessel washout and inspection for repairs. Also this cost does not include the caustic NASH tank caustic and the cost associated with that. The costs also do not include the scrubber unit maintenance and quite a bit more. This sheet is primarily the majority of variable costs.

I think realistically the cost per gallon for processing this material should be <u>at least $2.50 per gallon</u>. I do not know of any company who can or would even try to make the effort to process this type of material.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

WASTE TYPE & DETAILED INFORMATION
SIB load, 1st load processed; Job number 61849 (profile 2696) 4-8-2008

CES Environmental Services, Inc.

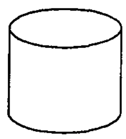
WASTE PROCESSING COST DATA SHEET

RAW MATERIALS USED	PERCENTAGE REQUIRED FOR TREATMENT (or generated in treatment)	COST Per Pound (or per %)	COST Per gallon	Waste Treatement % adjusted cost per gallon	TOTAL PER GALLON WASTE TREATMENT COST (variable cost only)
Sulfuric Acid	6.75	$0.1500	**$2.22**	$0.15	
Hydrogen Peroxide	20	$0.4000	**$3.74**	$0.75	
Ferric Chloride	1		**$2.50**	$0.03	
			$0.00		
Lime	10		**$0.18**	$0.02	
E-40 Polymer (anionic polymer)	1	$1.8500	**$0.02**		
Sodium Hydroxide (caustic)			**$2.95**		
Sodium Hypochlorite (bleach)			**$1.90**		
Celite 545, DE powder (diatomaceous earth)	Press ???				
Water to Process	each gallon		**$0.05**	$0.05	
EXTRA VOLUME of LIQUIDS CREATED (%)	6.57% + 60% + 1 + 10 + 1 = 78.75 %		**$0.05**	$0.04	
SOLIDS FORMED	30%				
SOLIDS FORMED (Corrected for extra volume)	53.60%	$0.0023		$0.12	
LABOR (extra)			**???**		
SPECIALTY TESTING (per load - 4,000 gl)	$200.00 per Load			$0.05	$1.21

CES Environmental
Services, Inc.

SIB PROCESSING SYSTEM TANK VOLUMES
with VOLUME INCREMENTS

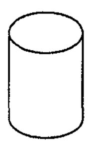
SULFURIC ACID BULK TANK



<u>This is a 5 foot in diameter Poly tank</u>. Filled to the ten (10) foot level this tank will hold 1,469 gallons. The following are the incremental gallon volumes for processing increments of this tank.

1. **1 inch = 12.24 gallons**
2. **3 inches = 36.72 gallons**
3. **6 inches = 73.44 gallons**
4. **1 foot (12 inches) = 146.9 gallons**

CAUSTIC SCRUBBER SYSTEM TANK



This is a 4 foot in diameter Carbon steel tank. Filled to the ten (10) foot level this tank will hold 940 gallons. The following are the incremental gallon volumes for each foot increments of this tank.

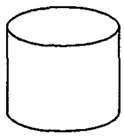
1. **Each foot (12 inches) = 94 gallons**

CES Environmental Services, Inc.

SIB PROCESSING SYSTEM TANK VOLUMES

with VOLUME INCREMENTS

SULFURIC ACID BULK TANK

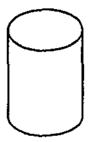


<u>This is a 5 foot in diameter Poly tank</u>. Filled to the ten (10) foot level this tank will hold 1,469 gallons. The following are the incremental gallon volumes for processing increments of this tank.

1 in 30 min 2 in 1 hr $\frac{24.48 \text{ gal}}{60 \text{ min}}$ .408 gpm

1. **1 inch = 12.24 gallons**
2. **3 inches = 36.72 gallons**
3. **6 inches = 73.44 gallons**
4. **1 foot (12 inches) = 146.9 gallons**

CAUSTIC SCRUBBER SYSTEM TANK



This is a 4 foot in diameter Carbon steel tank. Filled to the ten (10) foot level this tank will hold 940 gallons. The following are the incremental gallon volumes for each foot increments of this tank.

1. **Each foot (12 inches) = 94 gallons**

SIB TREATMENT PROCESSING

INTRODUCTION

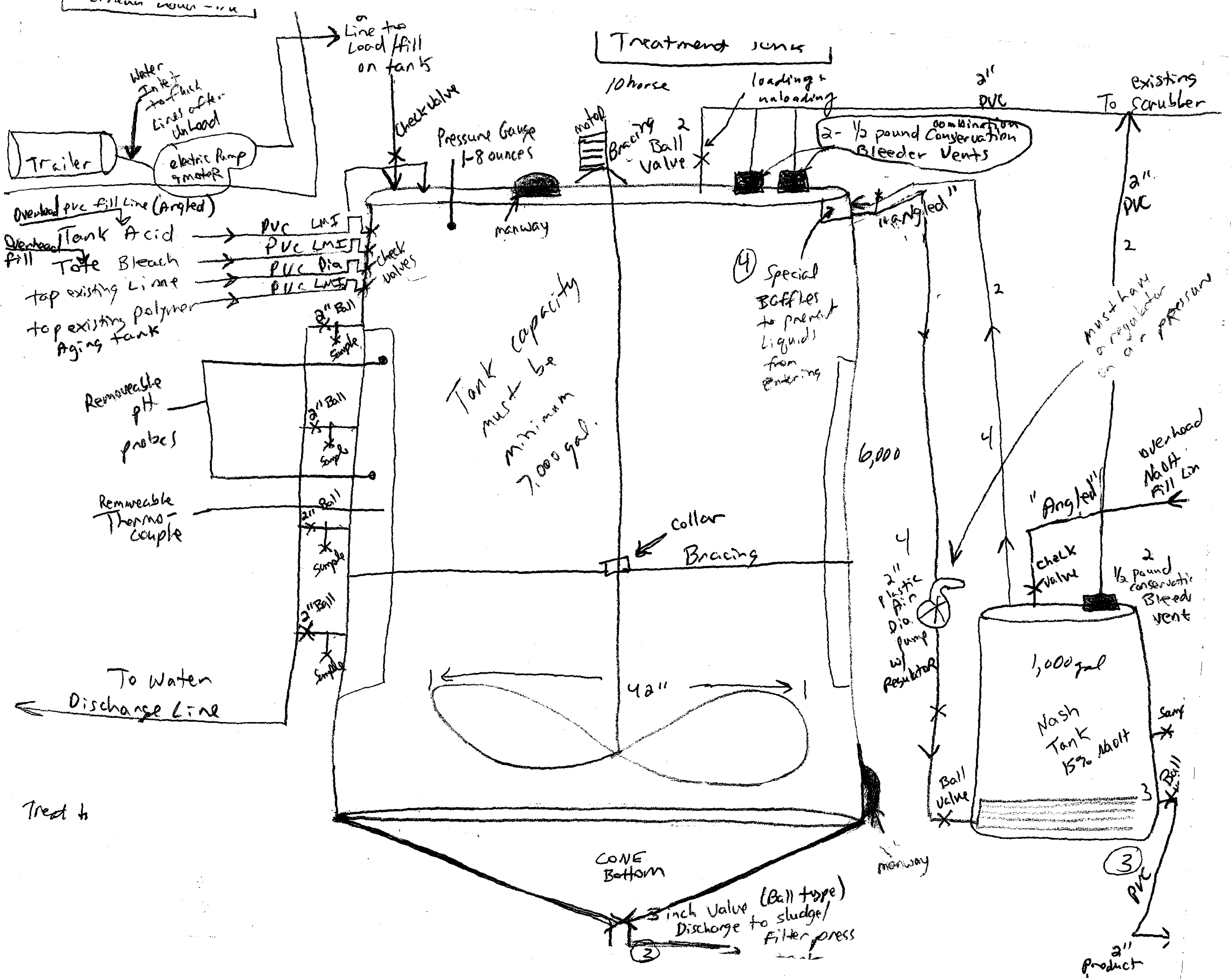
CES Environmental Services Inc. (CES) operates a ....etc.

1.0 PROCESS DESCRIPTION

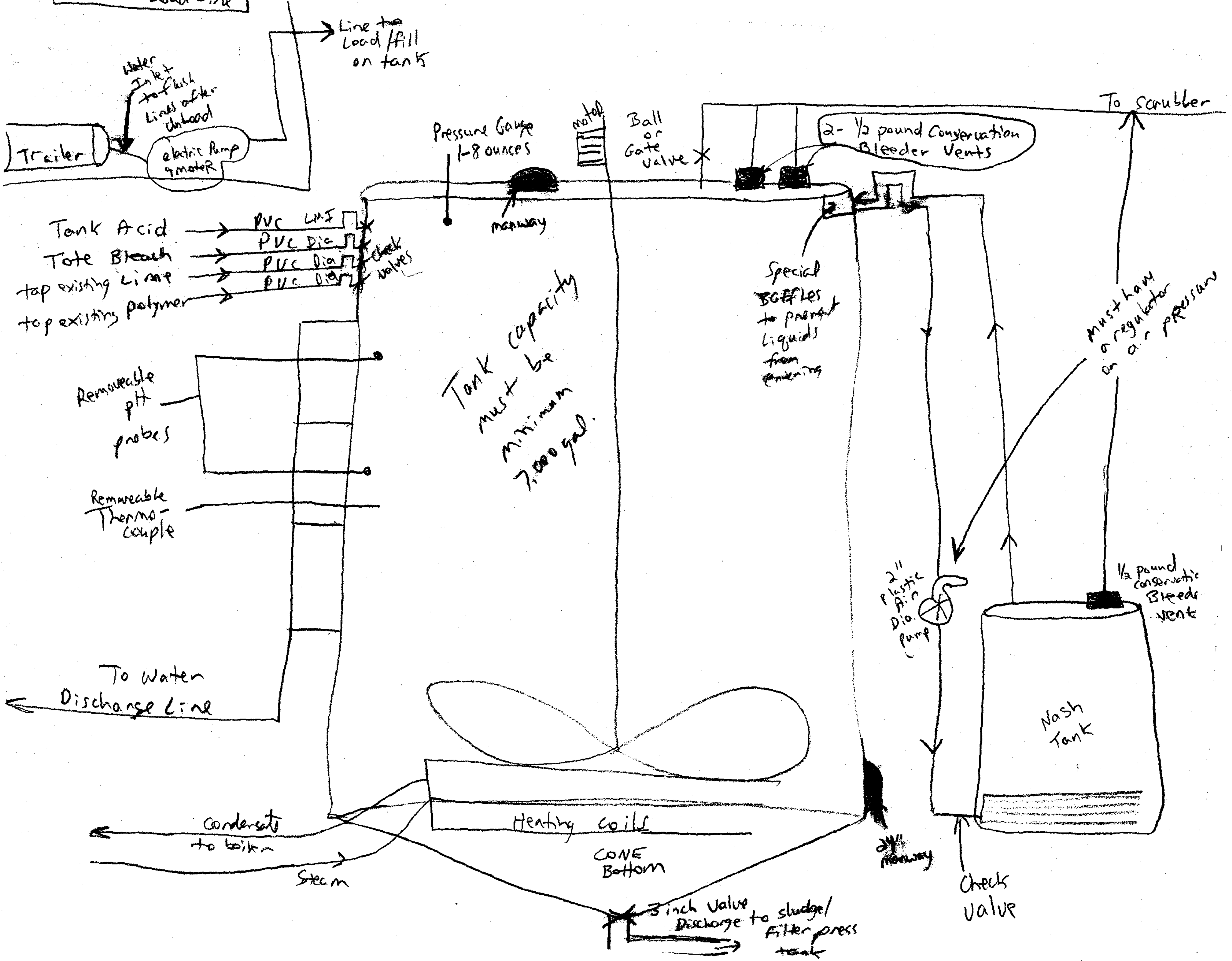
A mixture of water, sulfur isobutylene, sodium sulfide and sodium hydroxide is received into the facility by way of bulk transport trailer containers. This mixture is called "sulfurized isobutylene" or "SIB". The mixture is the waste water generated from the wash out of the reactor that makes the "SIB". The percent ranges of the constituents of the received waste water mixture are as follows:

a. Water 85 - 96%
b. Isobutylene sulfur compound 1 – 5%
c. Sodium Sulfide 1 – 5%
d. Sodium Hydrosulfide 2 – 5%

This received waste water mixture is transferred into a CES waste water treatment tank. In this tank there are several treatment steps involved in the treatment of this water. In the first stage of treatment the sulfides are oxidized with a hydrogen peroxide solution. The hydrogen peroxide used for the oxidation treatment has a strength in 8 – 12% concentration range. The hydrogen peroxide is slowly pumped into the treatment vessel to control the oxidation rate and the heat of the reaction. The hydrogen peroxide treatment requires about a 60% by volume of the peroxide to the SIB waste water for complete sulfide compound oxidation. Once the sulfide compounds have been oxidized the second stage of treatment is acidification with concentrated sulfuric acid (88 – 97% concentration). This stage of treatment adjusts the pH from the range of 9.5 – 10.5 su down to the pH range of 4.5 – 5.5 su. The volume of sulfuric acid required for this part of the treatment process is in the range of 5 – 6 % by volume. All vapors emitted from the transfer process, the oxidation process and the acidification process are captured in a sodium hydroxide caustic scrubbing system. Any vapors not captured in this scrubbing system are captured in the final processing scrubbing system. The caustic scrubbing system operates at a sodium hydroxide % concentration in the 15% range. After the treatment steps of oxidation and acidification the last stages of waste water treatment are completed. The last stages of waste water treatment involve treatment with ferric chloride, calcium hydroxide solution and anionic polymer solution. The batch treatment vessel is treated with approximately .5% by volume of ferric chloride and with approximately 12% by volume of a 35% calcium hydroxide solution. The vessel is then mixed thoroughly. The final stage of chemical treatment is with a waste water treatment anionic polymer with ionic charge in the 30 reactive site range. The anionic polymer addition is about .5% by volume. With proper agitation this final stage of chemical treatment creates the large flocculent that precipitates out metals and reduces BOD and suspended solids. The processing of the reacted treated vessel now processes through the filter press. The filtrate from the press processes through the waste water discharge. The solids generated process from the filter press to the receiving solids been. These solids are properly classified and are processed to a non-hazardous landfill.



EPAHO113001463



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S.T.O.P.

Sulfidic Treatment Operating Procedures

INTRODUCTION

The Sulfidic Treatment System is used primarily for receiving and treating streams with high sulfidic content. The process will involve oxidizing the sulfides and returning the stream to a treatable wastewater stream within the regulatory parameters established for CES Environmental Services Inc. Once the sulfides are successfully oxidized, the stream will be treated following the normal procedures used in the wastewater treatment plant. The operating procedures, safety systems, and the air quality controls are outlined in this manual.

24 ft³

80

OVERVIEW

The following is a process overview of quantities of chemicals, and order and speed of treatment. The product will be treated using a batch method where a load is received, transferred into the treatment tank, treated, and finally, sent to the filter press to remove any solids. The following is an itemized sequence of events.

10% conc.

- Approximately ~~5,000~~ 4,500 gal. of product is loaded into treatment tank.
- Inject ~~2,400~~ 2,700 gal. Hydrogen Peroxide/water mix into batch @ ~~1 to 3~~ 5-10 gpms. Hydrogen Peroxide and water will be mixed @ 800 Hydrogen Peroxide + 1,600 gal. of water.
- Once ~~injection is~~ the Hydrogen addition complete, batch will continue to mix while samples are tested in the lab to ensure no residual Hydrogen Peroxide is present.
- Once test results are good, inject approximately ~~400~~ 248 gals. of Sulfuric Acid @ ½ to 1 gpms.
- Test samples in lab to ensure that there are no Sulfides left in batch.
- Inject Ferric Chloride @ ~~4%~~ .5% or approximately ~~300~~ gal. 23
- Inject Lime to elevate ph to approx. ~~10.5.~~ 9.5-10.5 450 gal
- Add Polymer accordingly. 4.5 gal
- Filter press entire batch using standard filter press procedures.
- The caustic scrubber tank will be tested periodically during the process. The caustic has reached full capacity when it reaches 15% ~~30~~ % Sulfide content. Air samples will also be checked periodically to ensure no Sulfides are released to the main scrubber. 15% Caustic

$\boxed{7,226\ gal}$

$\boxed{300\ gal}$

$\boxed{8,226\ gal}$

$\boxed{500}$ gal tote

143 H_2O_2

357 H_2O

2 3/4 drums

35%

$(35)(x) = 10\%$

.28

72

$(28)(35) =$

$(\cancel{28})(35) + (72)(0) = (2700)(10)$

$35x = $ 771 per

1929 water

143 gal

trailer Wash Water 300 gal

EPAHO113001467

INDEX

Safety Systems

H2S monitors

The unit has been equipped with an H2S monitoring system. The sensors are strategically located in and around the surrounding areas. The system has been calibrated and will be recalibrated annually or as the need arises. There are sensors located at eye level when entering the area, also located on the catwalks surrounding the tanks, and by the exhaust stack of the primary scrubber.

Air regulators, Pressure gauges, and Orifices

All pumps are equipped with air regulators that will deter excessive air supplied to the pumps. Orifices have also been installed so that the desired amount of injection is obtained. The air pressure and orifice sizes have been established through bench scale testing to ensure proper injection rates. Pressure gauges have been installed on the treatment tank and the caustic scrubber tank to allow the operator to monitor pressures while operating.

Breathing air and 5 min. packs

Breathing air will be positioned and available in critical areas such as the upper catwalk area, the lower operating area, and entrance to processing area. 5 min. packs will be located in 2 areas on the upper catwalk and 2 areas in the lower operating area.

Evacuation plans

In the event of an alarm, the operator is to immediately alert any personnel to evacuate the building. The Stop addition of H_2O_2 or H_2SO_4, operator must don either the 5 min. pack or supplied air and assess the situation. If feasible the operator should determine the cause of the alarm and correct. If correction is not possible, the operator should evacuate and contact emergency personnel.

Pressure relief valves

The treatment tank is equipped with a calibrated ½ lb. conservation bleeder vent. This vent releases if the tank builds more than ½ lb. of pressure or ½ lb. of vacuum. If released the vent is tied into the primary scrubber so that the tank can't be overcome by pressure or vacuum. The treatment tank is also equipped with a 2 lb. pop-off relief valve in the event that the conservation vent fails. The caustic scrubber is equipped with a relief vent calibrated @ 2.5 lbs.

Emergency generator and Exhaust fan

An emergency generator with an auto start is set up in the event of a power failure. If the power goes out, the generator automatically starts and supplies power to the unit. This back-up is designed to allow the operator to bring down the unit properly until main power is re-established. An exhaust fan is installed on the roof above the unit. The fan is controlled to automatically engage when the H2S monitors alarm, or the power fails, which the back-up generator will run.

Air Quality Control

Potassium Permangenate

The carbon canister on the main scrubber is the final stage of the scrubber system. The carbon being used is impregnated with Potassium Permangenate which aides in the oxidation of sulfides.

Scrubber Solutions

The scrubber solutions consist of 2 treatment vats. The first vat consists of a caustic/bleach/water mixture to combat sulfide odors, and the second vat consists of a hydrocarbon encapsulator/deodorizer solution.

Caustic Scrub Tank

The vapors from the treatment tank will be pumped through diffusers located in the caustic scrub tank. This technique will enable the caustic in the scrub tank to absorb the sulfides released during treatment. The concentration will be monitored throughout the process. Max levels of absorption have been established, and once achieved the caustic will be changed out.

Processing Procedures

Transferring product from trailer to treatment tank

1. Bring loaded trailer into unloading bay.
2. Check to ensure air monitors are on and working properly.
3. Check to ensure that the processing tank is sealed up, and all valves are closed.
4. Hook up the vapor exchange line to the trailer and open the valve on the processing tank.
5. Open the fill valve located on top of the treatment tank.

6. Hook hose to trailer discharge fitting.
7. Open valves on trailer and open vent valve that is hooked up to the vapor exchange line.
8. Open valve on discharge side of pump.
9. Start pump and begin transferring product to the treatment tank.
10. When transfer is complete, hook air hose to crows-foot by valve on hose and blow line clean.
11. Close vapor exchange valve on trailer and pipe, and unhook.
12. Unhook trailer and put cap on hose.
13. Close fill valve on top of treatment tank.
14. Close vapor exchange valve on top of treatment tank.

Hydrogen Peroxide transfer from holding tank to mixing tote

1. Hydrogen Peroxide should be mixed @ 1 part Hydrogen Peroxide to 2 parts water.
2. Hydrogen Peroxide and water mixing will be regulated by flow meters to determine accurate mixture in tote.

Sulfuric Acid, Ferric Chloride, Caustic filling

1. 2" poly pumps are installed to fill tanks as needed. Each pump is outfitted with dedicated hoses, block valves, and check valves.
2. Pumps are located where forklifts are accessible to fill tanks as needed.

Hydrogen Peroxide injection

1. The Hydrogen Peroxide tote is equipped with a ½" diaphragm pump. It is also equipped with a flow meter and an air control valve. An Orifice plate has been installed to regulate the predetermined flow rate. The Orifice plate has been sized using 50 psi air consumption.
2. The Hydrogen Peroxide water mix will be injected between 1 and 3 gpms. The amount will start @ 1 gpm and ramp up to maximum allowable injection rate of 3 gpms. This process demands close monitoring so that the operator does not exceed the capacity of the vapor exchange pumps.
3. A typical 5,000 gal. load will take approx. 2,400 gal. of Hydrogen Peroxide mix.
4. When injecting spot checking the over flow line is important, as the product will foam if injected too fast.
5. The caustic scrubber should be checked periodically for sulfide content.
6. Air samples from the main scrubber should also be checked during this process.
7. Once complete allow mixer to run for 30 min. while continuously lab testing product for Hydrogen Peroxide contents. No Hydrogen Peroxide should be detected at this stage. If Hydrogen Peroxide is detected, allow product to continue mixing until no Hydrogen Peroxide is detected.

Sulfuric Acid injection

1. Once Hydrogen Peroxide parameters are satisfactory, close Hydrogen Peroxide valve on top of treatment tank and open Sulfuric Acid valve.
2. Begin injecting Sulfuric Acid by opening air control valve on Sulfuric Acid pump.
3. Pump is preset @ 50 psi with an Orifice plate of ½ gpm to 1 gpm.
4. Inject 400 gals. while monitoring pressures not to exceed ½ psi.
5. Once complete sample product to determine if any sulfides are present. If sulfides are present, consult with lab technician on injection rates.
6. Continue monitoring sulfide content in caustic scrubber during Sulfuric Acid injection.
7. Continue monitoring air samples in caustic scrubber during Sulfuric Acid injection.

Ferric Chloride injection

1. After lab test conclude that no sulfides are present in product, close Sulfuric Acid valve on top of tank and open Ferric Chloride valve.
2. Inject Ferric Chloride @ 5 gpms. to 4% or approx. 300 gals. Ensure pressure and temp. are within parameters.

Lime injection

1. Close Ferric Chloride valve on top of tank and open Lime injection valve.
2. Inject Lime until ph level reaches 10.5 on the ph monitoring system.

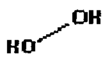
Polymer injection

1. Once ph levels 1.5 close Ferric Chloride valve and open Polymer valve on top of tank.
2. Inject Polymer as regulated per normal procedures in waste water treatment.

Filter Pressing

1. Once ph levels are satisfactory, begin pressing entire contents and return liquids to waste water treatment facility.

hydrogen peroxide [7722-84-1]



Synonyms: Albone; dihydrogen dioxide; H2O2; Hioxy; hydrogen dioxide; Hydrogen peroxide; HYDROGEN PEROXIDE, 30%; Hydroperoxide; Inhibine; Oxydol; Perhydrol; Peroxan; peroxide; superoxol; t-stuff;

Formula	H_2O_2	Molecular Weight	34.0146
CAS RN	7722-84-1	Melting Point (°C)	-11
ACX Number	X1002204-7	Boiling Point (°C)	150.2
Density	1.4067	Vapor Density	1.15
Refractive Index		Vapor Pressure	23.3
Evaporation Rate		Water Solubility	miscible.
Flash Point (°C)		EPA Code	
DOT Number	UN 2015 Oxidizer; UN 2014 Oxidizer; UN 2984	RTECS	MX0900000
Comments	Colorless liquid with a slightly sharp odor. OXIDIZING MATERIAL.		

Hydrogen peroxide

- Hydroperoxide

- Hydrogen dioxide
- Hydrogen peroxide, aqueous solution

Formula	H_2O_2
Structure	
Description	Clear, colorless liquid with a slight acrid odor. Aqueous solution (3-60 %) Properties are for a 20% solution.
Uses	Microbiocide, Fungicide, Herbicide, Rodenticide, Reducing Agent, Bleaching Agent.

Registry Numbers and Inventories.

CAS	7722-84-1
EC (EINECS/ELINCS)	231-765-0
EC Index Number	008-003-00-9
EC Class	Oxidizing; Corrosive
<u>EC Risk Phrase</u>	R 8 34
<u>EC Safety Phrase</u>	S 3 28 36/39 45
RTECS	MX0900000
RTECS class	Tumorigen; Drug; Mutagen
UN (DOT)	2015
Merck	13,4821
Beilstein/Gmelin	509 (G)
EPA OPP	595
Swiss Giftliste 1	G-6660
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Japan ENCS (MITI)	Listed
Korea ECL	Listed

Properties.

Formula	H_2O_2
Formula mass	34.01
Melting point, °C	-35
Boiling point, °C	108
Decomposition point, °C	70 (in water)
Vapor pressure, mm_{Hg}	25 (30 C)
Vapor density (air=1)	1.17
Evaporization number	>1 (butyl acetate=1)
Critical temperature	457
Critical pressure	207
Density	1.11 g/cm3
Solubility in water	Miscible
Viscosity	0.01249 P (20 C)
Surface tension	80.4 g/s2 (20 C)
Refractive index	1.34 (20 C)
Dipole moment	2.26 D
Dielectric constant	92.8 (18 C)
pKa/pKb	11.75 (pKa)
Thermal expansion	0.000785/K (20 C)
Heat of fusion	10.5 kJ/mol
Heat of vaporization	51.6 kJ/mol

Hazards and Protection.

Storage	Store in a cool(< 35C), well-ventilated dark area separated from combustible substances, reducing agents, strong bases, organics.Do not store on wooden shelves or floors. Suggest rotation of stock. Containers must be vented, but check periodically for bulging containers which can burst from pressure. Protect containers from physical damage, contamination, heat and incompatibles..

	Contamination from any source (dust, metals) may cause rapid decomposition with generation of large quantities of oxygen gas and high pressures.
WHMIS	C D2A E
Handling	Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed.
Protection	Wear appropriate protective gloves, clothing and goggles.
Respirators	Wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. This substance has unknown warning properties.
Small spills/leaks	Caustic material. Causes fires with organic material. Ventilate area of leak or spill. Contain and recover liquid when possible. Do not return spilled material to original container. Larger Spills: Dilute with a large amount of water and hold in a pond or dyked area until the peroxide decomposes followed by discharge into a suitable treatment system. May be neutralized with sodium metabisulfite or sodium sulfite after diluting to 5-10% peroxide. Do not flush undiluted material to sewer. This oxidizing material can increase the flammability of adjacent combustible materials. Empty containers should be rinsed with water before discarding.
Stability	Normally stable if uncontaminated, but slowly decomposes to release oxygen. Unstable with heat, may result in dangerous pressures.
Incompatibilities	reducing agents, organic materials, dirt, alkalis, rust, and many metals.
Decomposition	Decomposes to water and oxygen with rapid heat release.

Fire.

Fire fighting	Wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Water spray may be used to extinguish surrounding fire and cool exposed containers. Water spray will also reduce fume and irritant gases.
Fire potential	Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Increases the flammability of combustible, organic and readily

	oxidizable materials.
Hazards	Contact with oxidizable substances may cause extremely violent combustion. Drying of concentrated hydrogen peroxide on clothing or other combustible materials may cause fire or explosion. Sealed containers may rupture when heated.
Combustion products	Fire may produce irritating and/or toxic gases.
NFPA **Health**	3
Flammability	0
Reactivity	1
Special	O

Health.

Exposure limit(s)	TLV: 1 ppm; 1.4 mg/m3 (as TWA) (ACGIH 1992-1993). OSHA PEL: TWA 1 ppm (1.4 mg/m3) NIOSH REL: TWA 1 ppm (1.4 mg/m3) NIOSH IDLH: 75 ppm
Poison_Class	3
Exposure effects	Abnormally low blood pressure and apnea have been reported with severe poisonings. Cerebral edema, cerebral gas embolism, cerebral infarction, and seizures have been reported following ingestion of concentrated (35%) solutions. Death has been reported as a result of embolic cerebrovascular injury.
Ingestion	Corrosive and irritating to the mouth, throat, and abdomen. Large doses may cause symptoms of abdominal pain, vomiting, and diarrhea as well as blistering or tissue destruction. Stomach distention (due to rapid liberation of oxygen), and risk of stomach perforation, convulsions, pulmonary edema, coma, possible cerebral edema (fluid on the brain), and death are possible.
Inhalation	Vapors are corrosive and irritating to the respiratory tract. Inhalation of mist may burn the mucous membrane of the nose and throat. In severe cases, exposures may result in pulmonary edema and death.
Skin	Corrosive. Symptoms of redness, pain, and severe burn can occur.
Eyes	Vapors are very corrosive and irritating to the eyes. Symptoms include pain, redness and blurred vision. Splashes can cause permanent tissue destruction.

First aid

Ingestion	Seek medical assistance.
Inhalation	Monitor for respiratory tract irritation and hypoxia after severe inhalation exposure.
Skin	Remove contaminated clothing and wash exposed area thoroughly with soap and water. A physician should examine the area if irritation or pain persists.
Eyes	Immediately flush skin or eyes with running water for at least 20 minutes.

Transport.

UN number	2015
Response guide	143
Hazard class	5.1

Packing Group	I
USCG CHRIS Code	HPO
USCG Compatatibility Group	0 Unassigned.
Std. Transport #	4918335
IMO Pollution Category	C
IMO Hazard code	S/P

MATERIAL SAFETY DATA SHEET

Hydrogen Peroxide (20 to 40%)

MSDS Ref. No.: 7722-84-1-3
Date Approved: 04/27/2006
Revision No.: 10

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the Canada's Workplace Hazardous Materials Information System (WHMIS) and, the EC Directive, 2001/58/EC.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Hydrogen Peroxide (20 to 40%)

ALTERNATE PRODUCT NAME(S): Durox® Reg. & LR 35%, Oxypure® 35%, Standard 27.5 & 35%, Super D® 25 & 35, Technical 35%, HTP 35%, OHP 35%, Chlorate Grade, 20%, Semiconductor Reg, Seg, RGS, RGS 2, RGS 3, 31%

GENERAL USE: Durox® 35% Reg. & LR - meets the Food Chemical Codex requirements for aseptic packaging and other food related applications.

Oxypure® 35% - certified by NSF to meet NSF/ANSI Standard 60 requirements for drinking water treatment.

Standard 27.5 and 35% - most suitable grade for industrial bleaching, processing, pollution abatement and general oxidation reactions.

Semiconductor Reg, Seg, RGS, RGS 2, RGS 3, 31% - conform to ACS and Semi Specs. for wafer etching and cleaning, and applications requiring low residues.

Super D® 25 and 35% - meets US Pharmacopoeia specifications for 3% topical solutions when diluted with proper quality water. While manufactured to the USP standards for purity and to FMC's demanding ISO 9002 quality standards, FMC does not claim that it's Hydrogen Peroxide is manufactured in accordance with all pharmaceutical cGMP conditions.

Technical 35% - essentially free of inorganic metals suitable for chemical synthesis.

HTP 35% - specially formulated for aerospace equipment conditioning.

OHP 35% - specially formulated for OHP process, advanced oxidation, and activated peroxide applications

Chlorate Grade 20% - specially formulated for use in chlorate manufacture or processing.

MANUFACTURER

FMC CORPORATION
FMC Peroxygens
1735 Market Street
Philadelphia, PA 19103
(215) 299-6000 (General Information)

FMC of Canada Ltd.
FMC Peroxygens
PG Pulp Mill Road
Prince George, BC V2N2S6
(250) 561-4200 (General Information)

EMERGENCY TELEPHONE NUMBERS

(281) 474-8750 (Plant: Pasadena, TX, US - Call Collect)
(250) 561-4221 (Plant: Prince George, BC, Canada - Call Collect)
(303) 595-9048 (Medical - U.S. - Call Collect)

For leak, fire, spill, or accident emergencies, call:
(800) 424-9300 (CHEMTREC - U.S.A.)
(613) 996-6666 (CANUTEC - Canada)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- Clear, colorless, odorless liquid
- Oxidizer.
- Contact with combustibles may cause fire.
- Decomposes yielding oxygen that supports combustion of organic matters and can cause overpressure if confined.
- Corrosive to eyes, nose, throat, lungs and gastrointestinal tract.

POTENTIAL HEALTH EFFECTS: Corrosive to eyes, nose, throat and lungs. May cause irreversible tissue damage to the eyes including blindness. May cause skin irritation.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt.%	EC No.	EC Class
Hydrogen Peroxide	7722-84-1	20 - 40	231-765-0	Xn, R22-37/38-41
Water	7732-18-5	60 - 80	231-791-2	Not classified

4. FIRST AID MEASURES

EYES: Immediately flush with water for at least 15 minutes, lifting the upper and lower eyelids intermittently. See a medical doctor or ophthalmologist immediately.

SKIN: Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

INGESTION: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

NOTES TO MEDICAL DOCTOR: Hydrogen peroxide at these concentrations is a strong oxidant. Direct contact with the eye is likely to cause corneal damage especially if not washed immediately. Careful ophthalmologic evaluation is recommended and the possibility of local corticosteroid therapy should be considered. Because of the likelihood of corrosive effects on the gastrointestinal tract after ingestion, and the unlikelihood of systemic effects, attempts at evacuating the stomach via emesis induction or gastric lavage should be avoided. There is a remote possibility, however, that a nasogastric or orogastric tube may be required for the reduction of severe distension due to gas formation.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Flood with water.

FIRE / EXPLOSION HAZARDS: Product is non-combustible. On decomposition releases oxygen which may intensify fire.

FIRE FIGHTING PROCEDURES: Any tank or container surrounded by fire should be flooded with water for cooling. Wear full protective clothing and self-contained breathing apparatus.

FLAMMABLE LIMITS: Non-combustible

SENSITIVITY TO IMPACT: No data available

SENSITIVITY TO STATIC DISCHARGE: No data available

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Dilute with a large volume of water and hold in a pond or diked area until hydrogen peroxide decomposes. Hydrogen peroxide may be decomposed by adding sodium metabisulfite or sodium sulfite after diluting to about 5%. Dispose according to methods outlined for waste disposal.

Combustible materials exposed to hydrogen peroxide should be immediately submerged in or rinsed with large amounts of water to ensure that all hydrogen peroxide is removed. Residual hydrogen peroxide that is allowed to dry (upon evaporation hydrogen peroxide can concentrate) on organic materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in a fire.

7. HANDLING AND STORAGE

HANDLING: Wear chemical splash-type monogoggles and full-face shield, impervious clothing, such as rubber, PVC, etc., and rubber or neoprene gloves and shoes. Avoid cotton, wool and leather. Avoid excessive heat and contamination. Contamination may cause decomposition and generation of oxygen gas which could result in high pressures and possible container rupture. Hydrogen peroxide should be stored only in vented containers and transferred only in a prescribed manner (see FMC Technical Bulletins). Never return unused hydrogen peroxide to original container, empty drums should be triple rinsed with water before discarding. Utensils used for handling hydrogen peroxide should only be made of glass, stainless steel, aluminum or plastic.

STORAGE: Store drums in cool areas out of direct sunlight and away from combustibles. For bulk storage refer to FMC Technical Bulletins.

COMMENTS: VENTILATION: Provide mechanical general and/or local exhaust ventilation to prevent release of vapor or mist into the work environment.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
Hydrogen Peroxide	1 ppm (TWA)	1 ppm (PEL)	

ENGINEERING CONTROLS: Ventilation should be provided to minimize the release of hydrogen peroxide vapors and mists into the work environment. Spills should be minimized or confined immediately to prevent release into the work area. Remove contaminated clothing immediately and wash before reuse.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Use chemical splash-type monogoggles and a full-face shield made of polycarbonate, acetate, polycarbonate/acetate, PETG or thermoplastic.

RESPIRATORY: If concentrations in excess of 10 ppm are expected, use NIOSH/DHHS approved self-contained breathing apparatus (SCBA), or other approved atmospheric-supplied respirator (ASR) equipment (e.g., a full-face airline respirator (ALR)). DO NOT use any form of air-purifying respirator (APR) or filtering facepiece (AKA dust mask), especially those containing oxidizable sorbants such as activated carbon.

PROTECTIVE CLOTHING: For body protection wear impervious clothing such as an approved splash protective suit made of SBR Rubber, PVC (PVC Outershell w/Polyester Substrate), Gore-Tex (Polyester trilaminate w/Gore-Tex), or a specialized HAZMAT Splash or Protective Suite (Level A, B, or C). For foot protection, wear approved boots made of NBR, PVC, Polyurethane, or neoprene. Overboots made of Latex or PVC, as well as firefighter boots or specialized HAZMAT boots are also permitted. DO NOT wear any form of boot or overboots made of nylon or nylon blends. DO NOT use cotton, wool or leather, as these materials react RAPIDLY with higher concentrations of hydrogen peroxide. Completely submerge hydrogen peroxide contaminated clothing or other materials in water prior to drying. Residual hydrogen peroxide, if allowed to dry on materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in a fire.

GLOVES: For hand protection, wear approved gloves made of nitrile, PVC, or neoprene. DO NOT use cotton, wool or leather for these materials react RAPIDLY with higher concentrations of hydrogen peroxide. Thoroughly rinse the outside of gloves with water prior to removal. Inspect regularly for leaks.

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9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	Odorless
APPEARANCE:	Clear, colorless liquid
AUTOIGNITION TEMPERATURE:	Non-combustible
BOILING POINT:	103°C/218°F (20%); 107°C/225°F (31%); 108°C/226°F (35%)
COEFFICIENT OF OIL / WATER:	Not available
DENSITY / WEIGHT PER VOLUME:	Not available
EVAPORATION RATE:	Above 1 (Butyl Acetate = 1)
FLASH POINT:	Non-combustible
FREEZING POINT:	-15°C/6°F (20%); -26°C/-15°F (31%); -33°C/-27°F (35%)
ODOR THRESHOLD:	Not available
OXIDIZING PROPERTIES:	Strong oxidizer
PERCENT VOLATILE:	100%
pH:	(as is) < / = 3.7
SOLUBILITY IN WATER:	(in H_2O % by wt) 100%
SPECIFIC GRAVITY:	1.07 @ 20°C/4°C (20%); 1.11 @ 20°C/4°C (31%); 1.13 @ 20°C/4°C (35%)
VAPOR DENSITY:	(Air = 1): Not available
VAPOR PRESSURE:	28 mmHg @ 30°C (20%); 24 mmHg @ 30°C (31%); 23 mmHg @ 30°C (35%)

COMMENTS:

pH (1% solution) @ 25°C: 5.0 - 6.0

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Excessive heat or contamination could cause product to become unstable.
STABILITY:	Stable (heat and contamination could cause decomposition)
POLYMERIZATION:	Will not occur
INCOMPATIBLE MATERIALS:	Reducing agents, wood, paper and other combustibles, iron and other heavy metals, copper alloys and caustic.
HAZARDOUS DECOMPOSITION PRODUCTS:	Oxygen which supports combustion.

COMMENTS: Materials to Avoid : Dirt, organics, cyanides and combustibles such as wood, paper, oils, etc.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: 35% hydrogen peroxide: Extremely irritating/corrosive (rabbit) [FMC Study Number: I83-748]

SKIN EFFECTS: 35% hydrogen peroxide: Mildly irritating after 4-hour exposure (rabbit) [FMC Study Number: I83-747]

DERMAL LD_{50}: 35% hydrogen peroxide: > 2,000 mg/kg (rabbit) [FMC Study Number: I83-746]

ORAL LD_{50}: 35% hydrogen peroxide: 1,193 mg/kg (rat) [FMC Study Number: I83-745]

INHALATION LC_{50}: 50% hydrogen peroxide: > 0.17 mg/l (rat) [FMC Study Number: I89-1080]

TARGET ORGANS: Eyes, nose, throat and lungs

ACUTE EFFECTS FROM OVEREXPOSURE: Extremely irritating/corrosive to eyes and gastrointestinal tract. May cause irreversible tissue damage to the eyes including blindness. Inhalation of mist or vapors may be severely irritating to nose, throat and lungs. May cause skin irritation.

CHRONIC EFFECTS FROM OVEREXPOSURE: The International Agency for Research on Cancer (IARC) has concluded that there is inadequate evidence for carcinogenicity of hydrogen peroxide in humans, but limited evidence in experimental animals (Group 3 - not classifiable as to its carcinogenicity to humans). The American Conference of Governmental Industrial Hygienists (ACGIH) has concluded that hydrogen peroxide is a 'Confirmed Animal Carcinogen with Unknown Relevance to Humans' (A3).

CARCINOGENICITY:

Chemical Name	IARC	NTP	OSHA	Other
Hydrogen Peroxide	Listed	Not listed	Not listed	(ACGIH) Listed (A3, Animal Carcinogen)

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: Channel catfish 96-hour LC_{50} = 37.4 mg/L
Fathead minnow 96-hour LC_{50} = 16.4 mg/L
Daphnia magna 24-hour EC_{50} = 7.7 mg/L
Daphnia pulex 48-hour LC_{50} = 2.4 mg/L
Freshwater snail 96-hour LC_{50} = 17.7 mg/L
For more information refer to ECETOC "Joint Assessment of Commodity Chemicals No. 22, Hydrogen Peroxide." ISSN-0773-6339, January 1993

CHEMICAL FATE INFORMATION: Hydrogen peroxide in the aquatic environment is subject to various reduction or oxidation processes and decomposes into water and oxygen. Hydrogen peroxide half-life in freshwater ranged from 8 hours to 20 days, in air from 10-20 hrs. and in soils from minutes to hours depending upon microbiological activity and metal contaminants.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: An acceptable method of disposal is to dilute with a large amount of water and allow the hydrogen peroxide to decompose followed by discharge into a suitable treatment system in accordance with all regulatory agencies. The appropriate regulatory agencies should be contacted prior to disposal.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PROPER SHIPPING NAME:	Hydrogen peroxide, aqueous solutions with not less than 20% but not more than 40% hydrogen peroxide
PRIMARY HAZARD CLASS / DIVISION:	5.1 (Oxidizer)
UN/NA NUMBER:	UN 2014
PACKING GROUP:	II
LABEL(S):	Oxidizer, Corrosive
PLACARD(S):	5.1 (Oxidizer)

ADDITIONAL INFORMATION:

DOT Marking: Hydrogen Peroxide, aqueous solution with not less than 20%, but not more than 40% Hydrogen Peroxide, UN 2014

Hazardous Substance/RQ: Not applicable

49 STCC Number: 4918775

DOT Spec: stainless steel/high purity aluminum cargo tanks and rail cars. UN Spec: HDPE drums. Contact FMC for specific details.

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PROPER SHIPPING NAME:

Hydrogen peroxide, aqueous solutions with not less than 20%, but not more than 60% hydrogen peroxide.

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

PROPER SHIPPING NAME:

Hydrogen peroxide, aqueous solutions with not less than 20%, but not more than 40% hydrogen peroxide (*).

OTHER INFORMATION:

(*) Air regulations permit shipment of Hydrogen Peroxide (20 - 40%) in non-vented containers for Air Cargo Only aircraft, as well as for Passenger and Cargo aircraft. HOWEVER, all FMC Hydrogen Peroxide containers are vented and therefore, air shipments of FMC H_20_2 is not permitted. IATA air regulations state that venting of packages containing oxidizing substances is not permitted for air transport.

Protect from physical damage. Keep drums in upright position. Drums should not be stacked in transit. Do not store drum on wooden pallets.

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):
Not listed

SECTION 311 HAZARD CATEGORIES (40 CFR 370):
Fire Hazard, Immediate (Acute) Health Hazard

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.: None, (conc. <52%)

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):
Not listed

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):
Unlisted (Hydrogen Peroxide 20-40%); RQ = 100 lbs.; Ignitability, Corrosivity

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA INVENTORY STATUS (40 CFR 710):
Listed

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
RCRA IDENTIFICATION OF HAZARDOUS WASTE (40 CFR 261):
Waste Number: D001, D002

CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):

Product Identification Number:	2014
Hazard Classification / Division:	Class C (Oxidizer), Class D, Div. 2, Subdiv. B. (Toxic), Class E (Corrosive)
Ingredient Disclosure List:	Listed

INTERNATIONAL LISTINGS

Hydrogen peroxide:

China: Listed
Japan (ENCS): (1)-419
Korea: KE-20204
Philippines (PICCS): Listed

HAZARD, RISK AND SAFETY PHRASE DESCRIPTIONS:

Hydrogen Peroxide, (Index #008-003-00-9):

EC Symbols: Xn (Harmful)

EC Risk Phrases:	R22	(Harmful if swallowed.)
	R37/38	(Irritating to respiratory system and to skin.)
	R41	(Risk of serious damage to eyes.)
EC Safety Phrases:	S1/2	(Keep locked up and out of reach of children.)
	S3	(Keep in a cool place.)
	S17	(Keep away from combustible material.)
	S26	(In case of contact with eyes, rinse immediately with plenty of water and seek medical advice)
	S28	(After contact with skin, wash immediately with plenty of water and soap.)
	S36/37/39	(Wear suitable protective clothing, gloves and eye/face protection.)
	S45	(In case of accident or if you feel unwell, seek medical advice immediately - show the label where possible.)

16. OTHER INFORMATION

HMIS

Health	3
Flammability	0
Physical Hazard	1
Personal Protection (PPE)	H

Protection = H (Safety goggles, gloves, apron, the use of a supplied air or SCBA respirator is required in lieu of a vapor cartridge respirator)

HMIS = Hazardous Materials Identification System

Degree of Hazard Code:
4 = Severe
3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

NFPA

Health	3
Flammability	0
Reactivity	1
Special	OX

SPECIAL = OX (Oxidizer)

NFPA = National Fire Protection Association

Degree of Hazard Code:

4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

REVISION SUMMARY:
This MSDS replaces Revision #9, dated April 05, 2005.
Changes in information are as follows:
Section 1 (Product and Company Identification)
Section 16 (Other Information)

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hydrogen peroxide [7722-84-1]

Synonyms: Albone; dihydrogen dioxide; H2O2; Hioxy; hydrogen dioxide; Hydrogen peroxide; HYDROGEN PEROXIDE, 30%; Hydroperoxide; Inhibine; Oxydol; Perhydrol; Peroxan; peroxide; superoxol; t-stuff;

Formula	H_2O_2	Molecular Weight	34.0146
CAS RN	7722-84-1	Melting Point (°C)	-11
ACX Number	X1002204-7	Boiling Point (°C)	150.2
Density	1.4067	Vapor Density	1.15
Refractive Index		Vapor Pressure	23.3
Evaporation Rate		Water Solubility	miscible.
Flash Point (°C)		EPA Code	
DOT Number	UN 2015 Oxidizer; UN 2014 Oxidizer; UN 2984	RTECS	MX0900000
Comments	Colorless liquid with a slightly sharp odor. OXIDIZING MATERIAL.		

Hydrogen peroxide

- Hydroperoxide

- Hydrogen dioxide
- Hydrogen peroxide, aqueous solution

Formula	H_2O_2
Structure	
Description	Clear, colorless liquid with a slight acrid odor. Aqueous solution (3-60 %) Properties are for a 20% solution.
Uses	Microbiocide, Fungicide, Herbicide, Rodenticide, Reducing Agent, Bleaching Agent.

Registry Numbers and Inventories.

CAS	7722-84-1
EC (EINECS/ELINCS)	231-765-0
EC Index Number	008-003-00-9
EC Class	Oxidizing; Corrosive
EC Risk Phrase	R 8 34
EC Safety Phrase	S 3 28 36/39 45
RTECS	MX0900000
RTECS class	Tumorigen; Drug; Mutagen
UN (DOT)	2015
Merck	13,4821
Beilstein/Gmelin	509 (G)
EPA OPP	595
Swiss Giftliste 1	G-6660
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Japan ENCS (MITI)	Listed
Korea ECL	Listed

Properties.

Formula	H2O2
Formula mass	34.01
Melting point, °C	-35
Boiling point, °C	108
Decomposition point, °C	70 (in water)
Vapor pressure, mm_{Hg}	25 (30 C)
Vapor density (air=1)	1.17
Evaporization number	>1 (butyl acetate=1)
Critical temperature	457
Critical pressure	207
Density	1.11 g/cm3
Solubility in water	Miscible
Viscosity	0.01249 P (20 C)
Surface tension	80.4 g/s2 (20 C)
Refractive index	1.34 (20 C)
Dipole moment	2.26 D
Dielectric constant	92.8 (18 C)
pKa/pKb	11.75 (pKa)
Thermal expansion	0.000785/K (20 C)
Heat of fusion	10.5 kJ/mol
Heat of vaporization	51.6 kJ/mol

Hazards and Protection.

Storage	Store in a cool(< 35C), well-ventilated dark area separated from combustible substances, reducing agents, strong bases, organics.Do not store on wooden shelves or floors. Suggest rotation of stock. Containers must be vented, but check periodically for bulging containers which can burst from pressure. Protect containers from physical damage, contamination, heat and incompatibles..

	Contamination from any source (dust, metals) may cause rapid decomposition with generation of large quantities of oxygen gas and high pressures.
<u>WHMIS</u>	C D2A E
Handling	Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed.
Protection	Wear appropriate protective gloves, clothing and goggles.
Respirators	Wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. This substance has unknown warning properties.
Small spills/leaks	Caustic material. Causes fires with organic material. Ventilate area of leak or spill. Contain and recover liquid when possible. Do not return spilled material to original container. Larger Spills: Dilute with a large amount of water and hold in a pond or dyked area until the peroxide decomposes followed by discharge into a suitable treatment system. May be neutralized with sodium metabisulfite or sodium sulfite after diluting to 5-10% peroxide. Do not flush undiluted material to sewer. This oxidizing material can increase the flammability of adjacent combustible materials. Empty containers should be rinsed with water before discarding.
Stability	Normally stable if uncontaminated, but slowly decomposes to release oxygen. Unstable with heat, may result in dangerous pressures.
Incompatibilities	reducing agents, organic materials, dirt, alkalis, rust, and many metals.
Decomposition	Decomposes to water and oxygen with rapid heat release.

Fire.

Fire fighting	Wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Water spray may be used to extinguish surrounding fire and cool exposed containers. Water spray will also reduce fume and irritant gases.
Fire potential	Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Increases the flammability of combustible, organic and readily

		oxidizable materials.
Hazards		Contact with oxidizable substances may cause extremely violent combustion. Drying of concentrated hydrogen peroxide on clothing or other combustible materials may cause fire or explosion. Sealed containers may rupture when heated.
Combustion products		Fire may produce irritating and/or toxic gases.
NFPA	**Health**	3
	Flammability	0
	Reactivity	1
	Special	O

Health.

Exposure limit(s)	TLV: 1 ppm; 1.4 mg/m3 (as TWA) (ACGIH 1992-1993). OSHA PEL: TWA 1 ppm (1.4 mg/m3) NIOSH REL: TWA 1 ppm (1.4 mg/m3) NIOSH IDLH: 75 ppm
Poison_Class	3
Exposure effects	Abnormally low blood pressure and apnea have been reported with severe poisonings. Cerebral edema, cerebral gas embolism, cerebral infarction, and seizures have been reported following ingestion of concentrated (35%) solutions. Death has been reported as a result of embolic cerebrovascular injury.
Ingestion	Corrosive and irritating to the mouth, throat, and abdomen. Large doses may cause symptoms of abdominal pain, vomiting, and diarrhea as well as blistering or tissue destruction. Stomach distention (due to rapid liberation of oxygen), and risk of stomach perforation, convulsions, pulmonary edema, coma, possible cerebral edema (fluid on the brain), and death are possible.
Inhalation	Vapors are corrosive and irritating to the respiratory tract. Inhalation of mist may burn the mucous membrane of the nose and throat. In severe cases, exposures may result in pulmonary edema and death.
Skin	Corrosive. Symptoms of redness, pain, and severe burn can occur.
Eyes	Vapors are very corrosive and irritating to the eyes. Symptoms include pain, redness and blurred vision. Splashes can cause permanent tissue destruction.

First aid

Ingestion	Seek medical assistance.
Inhalation	Monitor for respiratory tract irritation and hypoxia after severe inhalation exposure.
Skin	Remove contaminated clothing and wash exposed area thoroughly with soap and water. A physician should examine the area if irritation or pain persists.
Eyes	Immediately flush skin or eyes with running water for at least 20 minutes.

Transport.

UN number	2015
Response guide	143
Hazard class	5.1
Packing Group	I
USCG CHRIS Code	HPO
USCG Compatatibility Group	0 Unassigned.
Std. Transport #	4918335
IMO Pollution Category	C
IMO Hazard code	S/P

SIB 3,212 gallons

SIB Hazardous Wastewater TREATMENT PROCESSING

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system.

(1.) H_2O_2 1. (1,927 gallons)

1. The first step of the treatment process is treatment ~~with a~~ 10% concentration of Hydrogen Peroxide. The required amount of the 10% Hydrogen Peroxide treatment chemical is 60% by volume of the received material. The SIB material has a density right at 1.284. This is 10.71 pounds per gallon. This value will allow received load paperwork listing the pounds received to be converted to gallons. The hydrogen peroxide reaction treatment process can be very exothermic generating quite a bit of heat. For this reason the hydrogen peroxide chemical addition rate is a precisely controlled treatment stream. **The rate of the 10% hydrogen peroxide should be controlled at a rate of addition of 6 gallons per minute maximum.** This rate may need to be slowed down. During this part of the treatment process the temperature can reach as high as 180 degrees F. The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

(2) Acid (193 gallons)

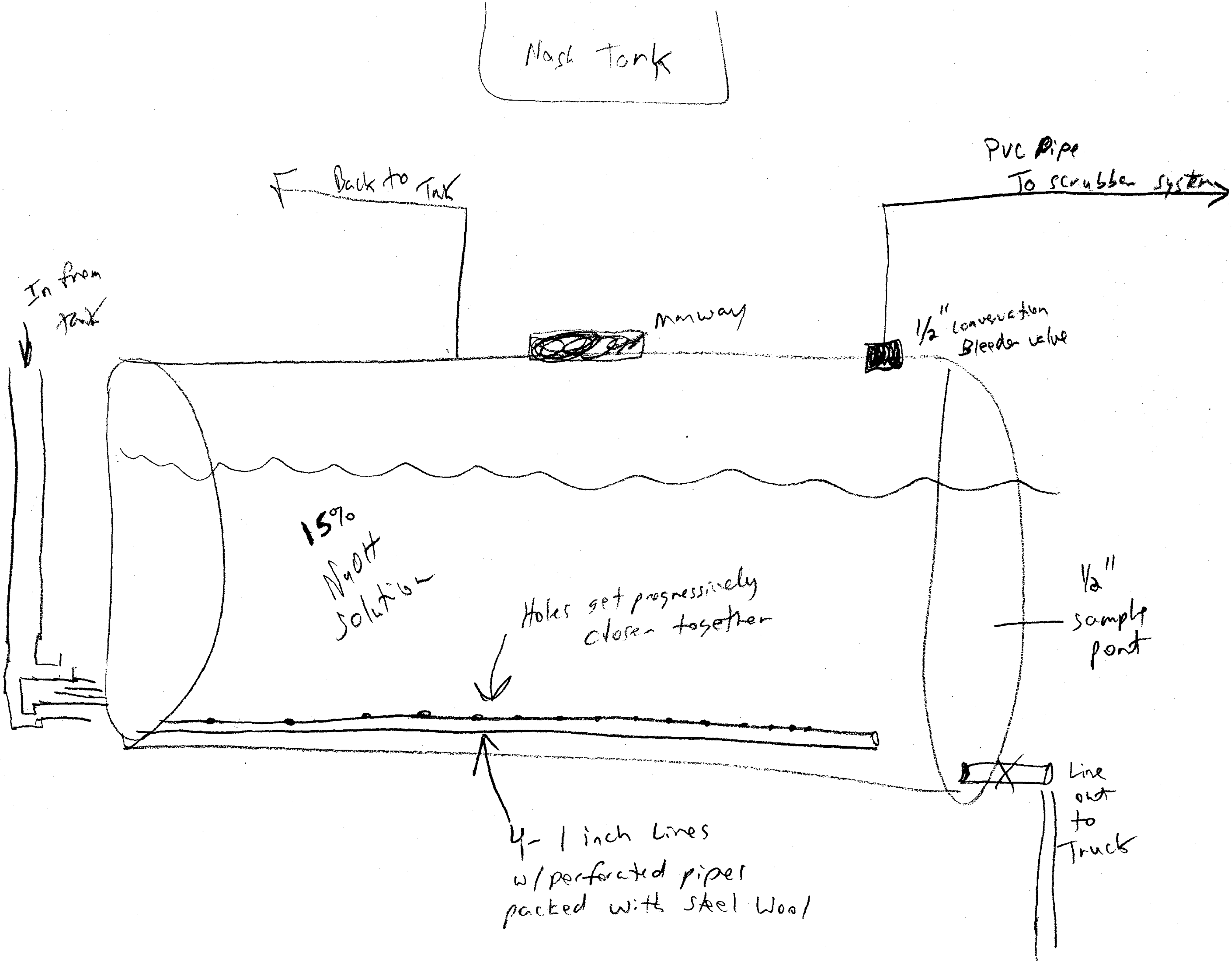
2. The second step of the treatment process is treatment with concentrated Sulfuric acid. The concentration of sulfuric acid is generally 93%. The density of this concentration of sulfuric acid is approximately 1.77. This is 14.77 pounds per gallon. The sulfuric acid addition rate is also a volume controlled treatment and also a rate controlled treatment. This part of the treatment process when completed is also verified through pH measurement and through a titration of the material from the reaction vessel. The titration is for hydrogen sulfide and mercaptan content in the treatment water. The treatment pH target point is a pH of 4.0 su (+/- 1 pH su, 3 – 5). When this pH has been reached then the treatment water needs to be tested for sulfides and mercaptans. There should not be any sulfides present greater than 3 ppm. There may be some mercaptans present which may cause a slight odor. Small amounts of mercaptans will be removed through the rest of the treatment for this material. If there are sulfides still

present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. **The initial target volume for the concentrated sulfuric acid addition is 6% by volume. The addition rate gpm of this material is required to be added at a precisely controlled rate.** This is very important. During this part of the treatment process there is also a slight exotherm. At this stage of treatment there is an increased rate of degassing and pressuring of the tank with the volume of gasses going to the scrubbers increasing. These vapors are also odorous and must be controlled. The addition rate of the concentrated sulfuric acid .5 gallons per minute. Just like is step 1 the sulfuric acid addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of acid per the 6% by volume has been added let the reaction vessel agitate for approximately 30 minutes before catching a sample from the vessel for checking for pH and for titration. As mentioned above If there are sulfides still present then continue to add volumes of sulfuric acid in % volume increments of .5% by volume of the initial volume of the SIB material pumped into the treatment vessel. Continue this until the required pH, sulfide and mercaptan test parameters have been met (3 – 5 pH su, 3 ppm sulfides and small amount of mercaptans, very slight odor). During this part of the treatment process this is the formation of solids. The solids formation start forming a little at the start of acid addition and continue to increase through this acid treatment step. The solids when first formed are soft and have a tendency to

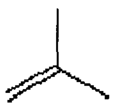
(3) Ferric 32 gallons > 9.0

(4) Lime 321 gallons – Slow (9.8) $\boxed{9-10}$

(5) Poly 32 gallons – Slow


Nash Tank
Back to Tank
PVC Pipe
To scrubber system
In from tank
Manway
1/2" conservation Bleeder valve
15% NaOH solution
Holes get progressively closer together
1/2" sample point
Line out to Truck
4- 1 inch Lines
w/perforated pipes
packed with Steel Wool

isobutylene [115-11-7]



Synonyms: 1,1-dimethylethylene; 2-methyl-1-propene; 2-methylpropene; 2-methylpropylene; isobutene; isobutylene; isobutylene, various grades; isopropylidenemethylene; Methylpropene; unsym. dimethylethylene; gamma-butylene;

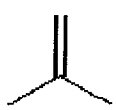
Formula	C_4H_8	Molecular Weight	56.1072
CAS RN	115-11-7	Melting Point (°C)	-140.3
ACX Number	X1003822-9	Boiling Point (°C)	-6.9
Density	0.6	Vapor Density	
Refractive Index		Vapor Pressure	
Evaporation Rate		Water Solubility	
Flash Point (°C)		EPA Code	
DOT Number	UN 1055	RTECS	UD0890000
Comments	a flammable, liquefiable gas.		

Isobutylene

- 2-Methylpropene
- Isobutene

Formula $CH_2=C(CH_3)_2$

Structure



Description	Isobutylene is a colorless gas with a faint petroleum-like odor. For transportation it may be stenched.
Uses	Used to produce trimers & other polymers of isobutylene, to produce antioxidants for foods, to produce antioxidants for packaging, food supplements, & for plastics.

Registry Numbers and Inventories.

CAS	115-11-7
EC (EINECS/ELINCS)	204-066-3
EC Index Number	601-012-00-4
EC Class	Extremely flammable
RTECS	UD0890000
RTECS class	Other
UN (DOT)	1055
Merck	12,5155
Beilstein/Gmelin	773645
Beilstein Reference	4-01-00-00796
Swiss Giftliste 1	G-6787
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Japan ENCS (MITI)	Listed
Korea ECL	Listed

Properties.

Formula	C_4H_8
Formula mass	56.11
Melting point, °C	-140.3
Boiling point, °C	-6.9

Vapor pressure, mm_{Hg}	2308 (20 C)
Vapor density (air=1)	1.9
Critical temperature	145
Critical pressure	39.5
Density	0.5942 g/cm3 (20 C)
Solubility in water	Insoluble
Viscosity	0.0081 cp (30)
Surface tension	12.3 g/s2 (20 C)
Refractive index	1.5072 (20 C)
Partition coefficient, pK_{ow}	2.34
Heat of fusion	5.9 kJ/mol
Heat of vaporization	20.6 kJ/mol
Heat of combustion	-2702 kJ/mol

Hazards and Protection.

Storage	Keep in a cool, dry, dark location in a tightly sealed container or cylinder. Keep away from incompatible materials, ignition sources and untrained individuals. Secure and label area. Protect containers/cylinders from physical damage.
Handling	All chemicals should be considered hazardous. Avoid direct physical contact. Use appropriate, approved safety equipment. Untrained individuals should not handle this chemical or its container. Handling should occur in a chemical fume hood.
Protection	Wear appropriate protective gloves, clothing and goggles. Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.
Respirators	Wear positive pressure self-contained breathing apparatus (SCBA).
Small spills/leaks	Keep sparks, flames, and other sources of ignition away. Keep material out of water sources and sewers. Attempt to stop leak if without undue personnel hazard. Use water spray to knock-down vapors.
Stability	Volatile liquid or easily liquefied gas. he substance is able to

	polymerize with fire or explosion hazard.
Incompatibilities	Incompatible with oxidizers Reacts easily with numerous materials, such as alkyl halides, halogens, concentrated sulfuric acid, hypochlorous acid, aluminum chloride, carbon monoxide and hydrogen with a cobalt catalyst.
Decomposition	When heated to decomposition it emits acrid smoke and fumes.

Fire.

Flash Point,°C	-76
Autoignition, °C	465
Upper exp. limit, %	8.8
Lower exp. limit, %	1.8
Fire fighting	Do not extinguish fire unless flow can be stopped. Use water in flooding quantities as fog. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible.
Fire potential	A very dangerous fire and explosion hazard when exposed to heat or flame.
Hazards	Containers may explode in fire. Vapor is heavier than air and may travel a long distance to a source of ignition and flash back.
NFPA **Health**	2
Flammability	4
Reactivity	1

Health.

Poison_Class	4
Exposure effects	Mild central nervous system depression or excitation may occur after ingestion or vapor inhalation. CNS effects can occur secondary to hydrocarbon pneumonitis and hypoxia, or from additives and contaminants (aniline, heavy metals, camphor, or pesticides). Some hydrocarbons are simple asphyxiants (e.G., Methane, ethane, propane gasses) which can produce CNS effects secondary to hypoxia. In a prospective study in Toronto, major congenital malformations were noted in 13 of 125 fetuses of mothers exposed to organic solvents during pregnancy.

Ingestion Nausea, vomiting, diarrhea, and abdominal pain may occur following ingestion.

Inhalation Coughing, choking, tachypnea, dyspnea, cyanosis, rales, hemoptysis, pulmonary edema, pneumatoceles, lipoid pneumonia, or respiratory arrest may develop following ingestion and aspiration.

Skin Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.

Eyes May cause irritation.

First aid

Ingestion This compound is a gas, therefore inhalation is the first route of exposure.

Inhalation IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used.

Skin CAUTION: Exposure of skin to compressed gases may result in freezing of the skin. Treatment for frostbite may be necessary. Remove the victim from the source of contamination. IMMEDIATELY wash affected areas gently with COLD water (and soap, if necessary) while removing and isolating all contaminated clothing. Dry carefully with clean, soft towels. If symptoms such as inflammation or irritation develop, IMMEDIATELY call a physician or go to a hospital for treatment.

Eyes First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

Transport.

UN number 1055

Response guide 115

Hazard class	2.1
USCG CHRIS Code	IBL
USCG Compatatibility Group	30 Olefins
Std. Transport #	4905757 4905433 4905434 4905753 4905759

SIB TREATMENT PROCESSING

INTRODUCTION

CES Environmental Services Inc. (CES) operates a ....etc.

1.0 PROCESS DESCRIPTION

A mixture of water, sulfur isobutylene, sodium sulfide and sodium hydroxide is received into the facility by way of bulk transport trailer containers. This mixture is called "sulfurized isobutylene" or "SIB". The mixture is the waste water generated from the wash out of the reactor that makes the "SIB". The percent ranges of the constituents of the received waste water mixture are as follows:

a. Water 85 - 96%
b. Isobutylene sulfur compound 1 – 5%
c. Sodium Sulfide 1 – 5%
d. Sodium Hydrosulfide 2 – 5%

This received waste water mixture is transferred into a CES waste water treatment tank. In this tank there are several treatment steps involved in the treatment of this water. In the first stage of treatment the sulfides are oxidized with a hydrogen peroxide solution. The hydrogen peroxide used for the oxidation treatment has a strength in 8 – 12% concentration range. The hydrogen peroxide is slowly pumped into the treatment vessel to control the oxidation rate and the heat of the reaction. The hydrogen peroxide treatment requires about a 60% by volume of the peroxide to the SIB waste water for complete sulfide compound oxidation. Once the sulfide compounds have been oxidized the second stage of treatment is acidification with concentrated sulfuric acid (88 – 97% concentration). This stage of treatment adjusts the pH from the range of 9.5 – 10.5 su down to the pH range of 4.5 – 5.5 su. The volume of sulfuric acid required for this part of the treatment process is in the range of 5 – 6 % by volume. All vapors emitted from the transfer process, the oxidation process and the acidification process are captured in a sodium hydroxide caustic scrubbing system. Any vapors not captured in this scrubbing system are captured in the final processing scrubbing system. The caustic scrubbing system operates at a sodium hydroxide % concentration in the 15% range. After the treatment steps of oxidation and acidification the last stages of waste water treatment are completed. The last stages of waste water treatment involve treatment with ferric chloride, calcium hydroxide solution and anionic polymer solution. The batch treatment vessel is treated with approximately .5% by volume of ferric chloride and with approximately 12% by volume of a 35% calcium hydroxide solution. The vessel is then mixed thoroughly. The final stage of chemical treatment is with a waste water treatment anionic polymer with ionic charge in the 30 reactive site range. The anionic polymer addition is about .5% by volume. With proper agitation this final stage of chemical treatment creates the large flocculent that precipitates out metals and reduces BOD and suspended solids. The processing of the reacted treated vessel now processes through the filter press. The filtrate from the press processes through the waste water discharge. The solids generated process from the filter press to the receiving solids been. These solids are properly classified and are processed to a non-hazardous landfill.

Gary Peterson

From: Marlin Moser
Sent: Monday, March 24, 2008 9:34 AM
To: Gary Peterson
Subject: FW: SIB water

From: Marlin Moser
Sent: Monday, March 24, 2008 7:23 AM
To: Philip Evans
Subject: SIB water

Phillip,

We are still at it with this SIB water. I'm wondering if we could meet PBR if we changed the treatment process. We have had success in the lab treating this using a different procedure that releases little or no Hydrogen sulfide during treatment.

We are oxidizing the Sulfides with Hydrogen Peroxide first in order to oxidize the sulfides and not release Hydrogen sulfide. The system is still the same.

The make-up if the material we are attempting to treat is as follows:

Water -	85%
Sufurized Isobutylene -	1 – 5%
Sodium sulfide -	1 – 5%
Sodium Hydroxide -	2 – 5%

This material is waste water from wash out of the reactor that makes SIB.

We are hoping this changes the ability to obtain a PBR. Please advise.

Marlin
713-539-6574

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Curran international
Applying coating solutions

Joan

(b) (6) [redacted]

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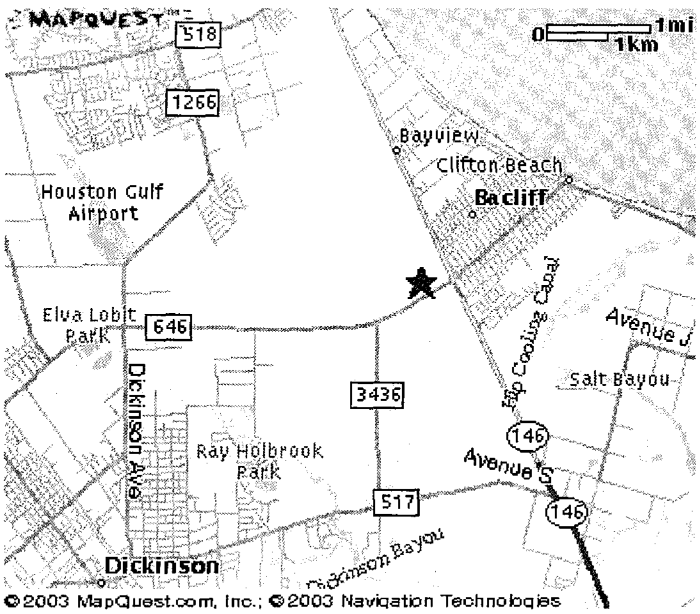

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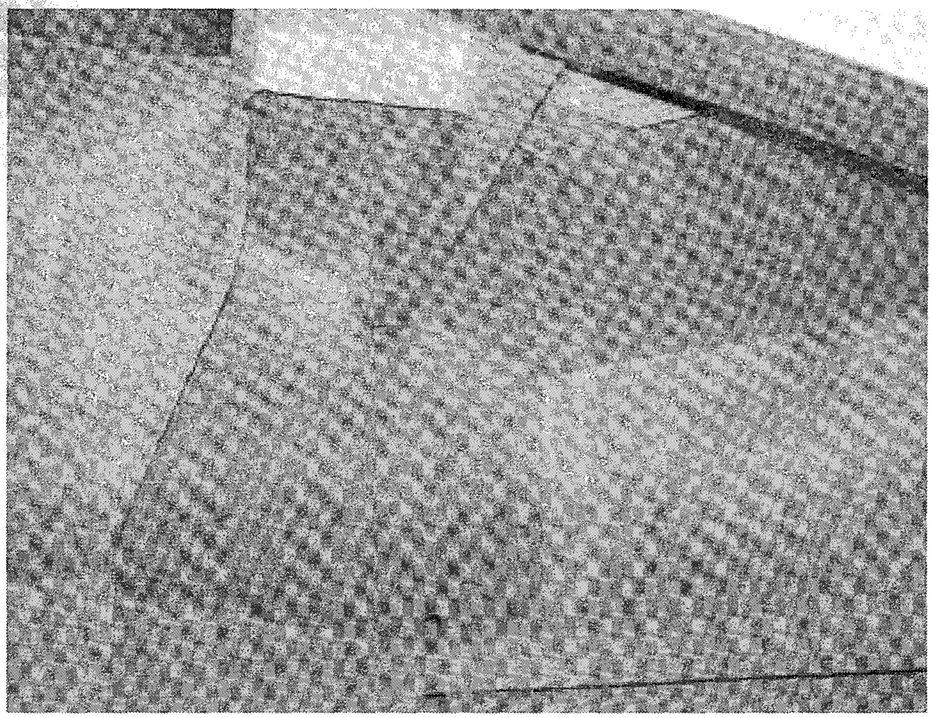
MARINE

SIGMA COATINGS

SIGMA Novaguard 840/200

Solvent-free, single or two-coat, amine cured phenolic epoxy tank coating system



- Good resistance against a wide range of chemicals and solvents.
- Exceptional pitfilling and edge coverage with no shrinkage at high film thickness.
- Excellent resistance to crude oil up to 70°C.
- Suitable for contact with liquid foodstuffs.
- Gloss finish for easy cleaning.
- Easy and safe application.

GROUND BREAKING SOLVENT-FREE TANK COATING

GREATLY IMPROVED HEALTH AND SAFETY CONDITIONS

WIDE CARGO FLEXIBILITY

SIGMA COATINGS | Protecting the Future

SIGMA Novaguard 840/200

Sigma Novaguard is an innovative tank coating that combines broad chemical resistance of epoxy phenolic systems with the unique environmental advantages of being a solvent free product. It is especially useful for widening and extending the profitability of older cargo vessels.

Tankers are able to take advantage of a wide range of cargoes from chemicals and solvents to crude oil and liquid foodstuffs. At the same time they also benefit from healthier, safer and more environmentally friendly working conditions leading to a faster turnaround. Solvent-free application eliminates the hazards of explosion and fire. Less ventilation and specialist is required. Excellent pitfilling ensures quick and reliable maintenance. A smooth, gloss finish enables easier cleaning.

Sigma Novaguard

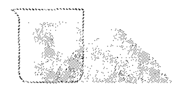
A solvent free amine cured phenolic epoxy coating which can be applied as a one or two coat system with a total dry film thickness of 300 microns. Application is by airless spray, or brush/roller for repair and stripe coating.

Resistance of various tank coatings

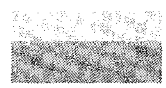
Product	Sigma Phenguard	Sigma Novaguard	SigmaGuard 720	SigmaGuard 750
Type	Phenolic Epoxy	Solvent Free Epoxy	Pure Epoxy	Zinc silicates
Aliphatic hydrocarbons	+	+	+	+
Benzene, toluene	+	+	+	+
Xylene and higher aromatics	+	+	+	+
Crude oils 70°C	+	+	+	+
Methanol	+	-	-	+
EDC	+	-	-	+
Caustic soda	+	+	+	-
Vegetable oils & acids (restriction on acid value)	+	<100	<20	<5
Ammonia solution 25%	+	-	-	-
Oxygenated petrol	+	+	+	+
Sea water	+	+	+	+

+ = resistant - = not resistant
Indication reference only, for complete resistance see Cargo Resistance List

- Unique solvent-free tank coating
- Greatly improved health and safety conditions
- Good resistance against a wide range of chemicals and solvents including grey water, black water and galley waste
- Approved to Air BP F2D2 section 2.1 for jet fuels
- Excellent resistance to crude oil up to 70°C
- Suitable for contact with liquid foodstuffs
- Exceptional pitfilling
- Gloss finish for easy cleaning
- Highly suitable for glass fibre reinforced systems
- No risk of explosion or fire during application

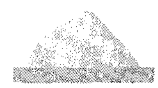


Allows wide range of cargoes



Excellent pit-filling

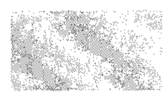
No shrinkage



Meets international regulations for food products

~~SOLVENTS~~

Solvent-free, improving working conditions



Easy-to-clean gloss surface

Complementary documentation

Sigma Novaguard 840 - Product data sheet 7468
Sigma Novaguard 200 - Product data sheet 7462
Tanklining selection table - System data sheet 3310

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P.O. Box 43, 1420 AA Uithoorn, The Netherlands. Tel: +31 (0)20 407 5050 Fax: +31 (0)20 407 5059
Email: sigma.marinecoatings@sigmakalon.com Website: www.sigmacoatings.com/marine

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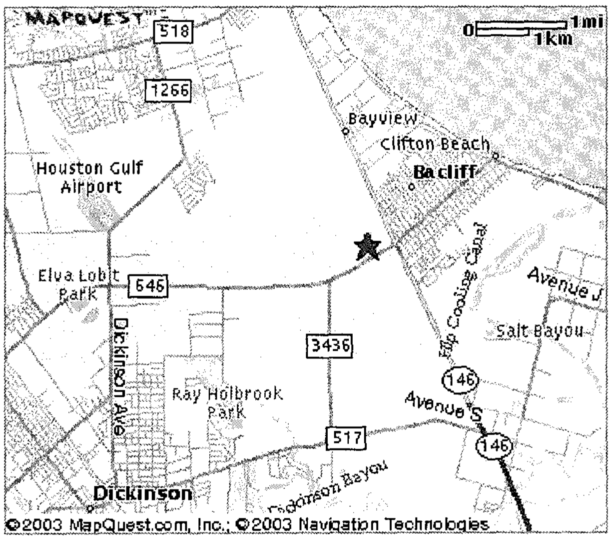

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IMC 20-201

Mixing: IMC 20-201 **Epoxy Tank Coating** is a two-component product ... Do not allow coating to remain in the **application** equipment longer than 1.45 hours. ...
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Tank Coating Services on ThomasNet.com

Company Profile: Coating services for industrial, medical **applications**. Painting services include baked enamel, **epoxy** coatings, fuel tank coatings, ...
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Floor Systems & Coatings

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Industrial Coatings by Ceram-Kote

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tank coating applications due to their ability to ensure correct. **application** of **epoxy** linings.In steel and concrete water storage tanks,the use ...
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Epoxy High Build Coating
Duracoat - 6000 is a two-component high solid **epoxy** coating designed to provide ... Can tolerate high humidity or surface dampness during **application**. ...
www.anupampaints.com/coatings/duracoat_6000.htm - 36k - Cached - Similar pages

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Aluminum oxide [11092-32-3]
Synonyms: Aluminum oxide;

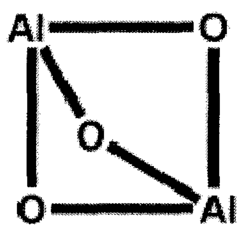
Formula		Molecular Weight	
CAS RN	11092-32-3	Melting Point (°C)	
ACX Number	X1041168-4	Boiling Point (°C)	
Density		Vapor Density	
Refractive Index		Vapor Pressure	
Evaporation Rate		Water Solubility	
Flash Point (°C)		EPA Code	
DOT Number		RTECS	
Comments			

Aluminum oxide

- Aluminum trioxide
- Alumina
- alpha-Aluminum oxide

Formula Al_2O_3

Structure



Description White crystalline solid or powder, very hard, odorless.

Uses Production of aluminum, manufacture of abrasives, refractories, ceramics, electrical insulators, catalyst & catalyst supports, paper, spark plugs, crucibles & laboratory works, adsorbent for gases & water vapors, chromatographic analysis, fluxes, light bulbs, artificial gems, heat resistant fibers, food additive (dispersing agent).

Registry Numbers and Inventories.

CAS	1344-28-1
EC (EINECS/ELINCS)	215-691-6
EC Safety Phrase	S 22
RTECS	BD1200000
RTECS class	Tumorigen
Merck	12,369
Beilstein/Gmelin	48822 (G)
Swiss Giftliste 1	G-7734
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Japan ENCS (MITI)	Listed
Korea ECL	Listed

Properties.

Formula	Al2O3
Formula mass	101.94
Melting point, °C	2050
Boiling point, °C	2980
Density	3.97 g/cm3
Solubility in water	Insoluble

Hazards and Protection.

Storage	Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.
WHMIS	Insufficient information
Handling	Use with adequate ventilation. Minimize dust generation and

	accumulation. Avoid prolonged or repeated contact with skin. Avoid contact with eyes. Avoid ingestion and inhalation.
Protection	Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Skin: Wear appropriate gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators	Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.
Small spills/leaks	Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions.
Stability	Stable under normal shipping and handling conditions.
Incompatibilities	Reacts with chlorine trifluoride or ethylene oxide.
Decomposition	None.

Fire.

Fire fighting	Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Extinguishing media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.
Fire potential	Noncombustible material.
NFPA Health	1
Flammability	0
Reactivity	0

Health.

Exposure limit(s)	OSHA PEL: TWA 15 mg/m3 (total) TWA 5 mg/m3 (resp) NIOSH REL: See Appendix D
Poison_Class	-
Exposure effects	Chronic inhalation of fine dusts may cause lung damage.
Ingestion	Ingestion of large amounts may cause gastrointestinal irritation. Expected to be a low ingestion hazard.

Inhalation	May cause respiratory tract irritation. May cause lung damage.
Skin	Dust may cause mechanical irritation. Low hazard for usual industrial handling.
Eyes	Dust may cause mechanical irritation.

First aid

Ingestion	If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation	Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.
Skin	Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.
Eyes	Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Transport.

USCG CHRIS Code	ALO
HS Code	2818 10 10

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NEWARK, NEW YORK

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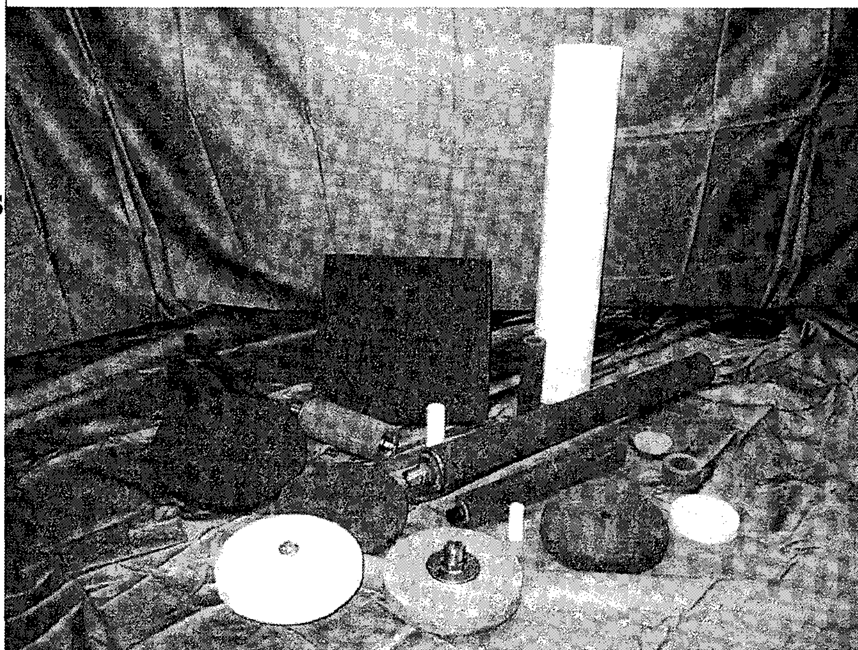
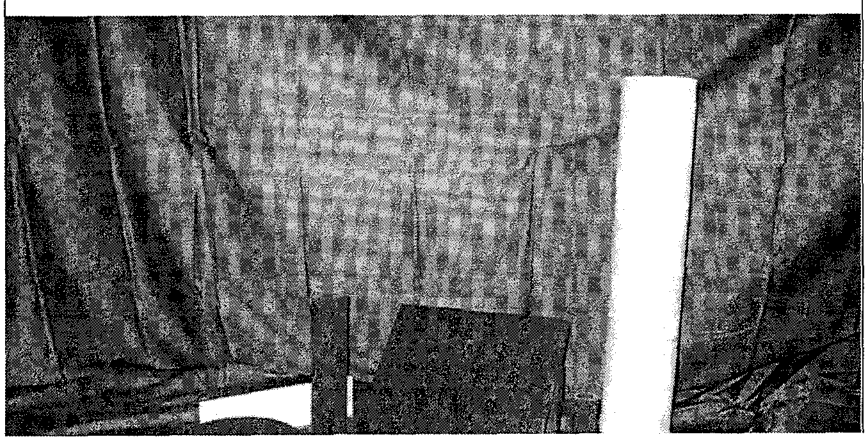
Porous Ceramic Diffusers



for
durability, chemical, corrosion and wear resistance, toughness, and density.

Refractron porous ceramic diffusers are used for applications that require the production and dispersion of fine air or gas bubbles through the porous ceramic into a liquid. The smaller the bubbles the more gas is exposed to the liquid increasing the gas transfer efficiency. Diffusers or spargers can also be designed into the system to cause turbulence or mixing if desired.

The range of Refractron porous ceramic diffusers are made by fusing aluminum oxide grains using porcelain bond to for a strong, uniformly porous and homogeneous structure. The naturally hydrophilic material is easily wetted resulting in the production of fine, uniform bubbles. Refractron's porous ceramic has 40-50% open porosity and is available in pore sizes ranging from 0.25 to 90 microns. Monolithic, single grade, aluminum oxide porous ceramic is available in 6, 15, 30, 50, 60 and 90 micron pore sizes. In addition, Refractron produces a ceramic membrane that uses a medium pore substrate with a thin coating of fine porous ceramic membrane in 0.25, 1, 3 and 6 micron pore sizes.



Types of Ceramics

Structural Ceramics

Porous Ceramics

Ceramic Applications & Industries Served

Porous Ceramics

- Filtration
- Diffusion, Sparging, & Aeration
- Wicking & Dispersion
- Fluid Bed, Pneumatic Handling
- Desiccant Filter Cores

Structural Ceramics

- Wear Components for Petrochemical
- Corrosion Resistant Valve Parts
- Dental Ceramics
- Zirconia Ceramic Balls

Ceramic Materials

Structural Zirconia

- Magnesia Partially Stabilized Zirconia (Mg-PSZ)
- Yttria Tetragonal Zirconia Polycrystal (Y-TZP)

Porous Ceramics

- Aluminum Oxide
- Silicon Carbide

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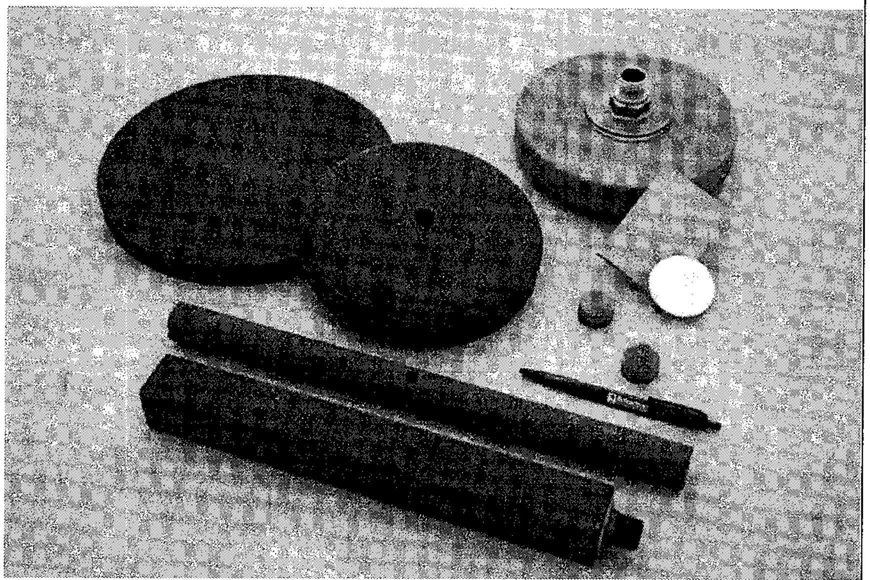
removed.
Specifically tailored techniques include spraying, brushing, backwashing, oven firing, dilute acid cleaning, solvent cleaning plus steam and ultrasonic cleaning.



other
custom components made from aluminum oxide where tightly controlled pore size and porosity for fine bubble production is critical. This range of diffuser product is also called air stones, bubblers, spargers and aerators. Common uses for porous ceramic diffusers include: aeration in municipal waste water plants, diffusion for chemical reactions, ozone diffusers for drinking water, oxygen diffusion, sparging in pharmaceutical process plus diffusion for aquaculture and hydroponics applications. Other specialty products include a range of adsorbent filter/drier cores for refrigeration applications, dispersion parts, vacuum chucks, inkpads and gas probes.

Porous ceramics are readily machinable using conventional diamond cutters and wheels. Since it is not ductile and the granules are removed the porous ceramic pore structure is not affected by cutting and grinding. Typical diamond tile saws are routinely used to cut porous ceramic tubes and test coupons.

We work closely with our customers to define their needs and the requirements of each specific diffuser application. Our engineering and sales team is great at attacking technical design and process problems, then customizing an innovative solution using our broad range of advanced industrial ceramics. Contact us with your application requirements.

Refractron Technologies Corp. 5750 Stuart Avenue Newark, NY 14513-9798

phone: (315) 331-6222 fax: (315) 331-7254

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Device and method for removal of gas contaminates through a ...

A 7.5 inch diameter ceramic **fine bubble diffuser** (**USA Blue Book**) was placed in the bottom of the reactor. A 5/8 inch garden hose was used to bring odorous ...
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Porous Ceramic Diffusers, 3-18-2008 grp

Refractron Technologies Corp. 5750 Stuart Avenue Newark, NY 14513-9798

phone: (315) 331-6222 fax: (315) 331-7254 info@refractron.com

Refractron Technologies Corp. is a leading manufacturer of technical ceramics. Products include both controlled porosity and densely structured ceramics designed to meet requirements specified by our customers for durability, chemical, corrosion and wear resistance, toughness, and density.

Refractron porous ceramic diffusers are used for applications that require the production and dispersion of fine air or gas bubbles through the porous ceramic into a liquid. The smaller the bubbles the more gas is exposed to the liquid increasing the gas transfer efficiency. Diffusers or spargers can also be designed into the system to cause turbulence or mixing if desired.

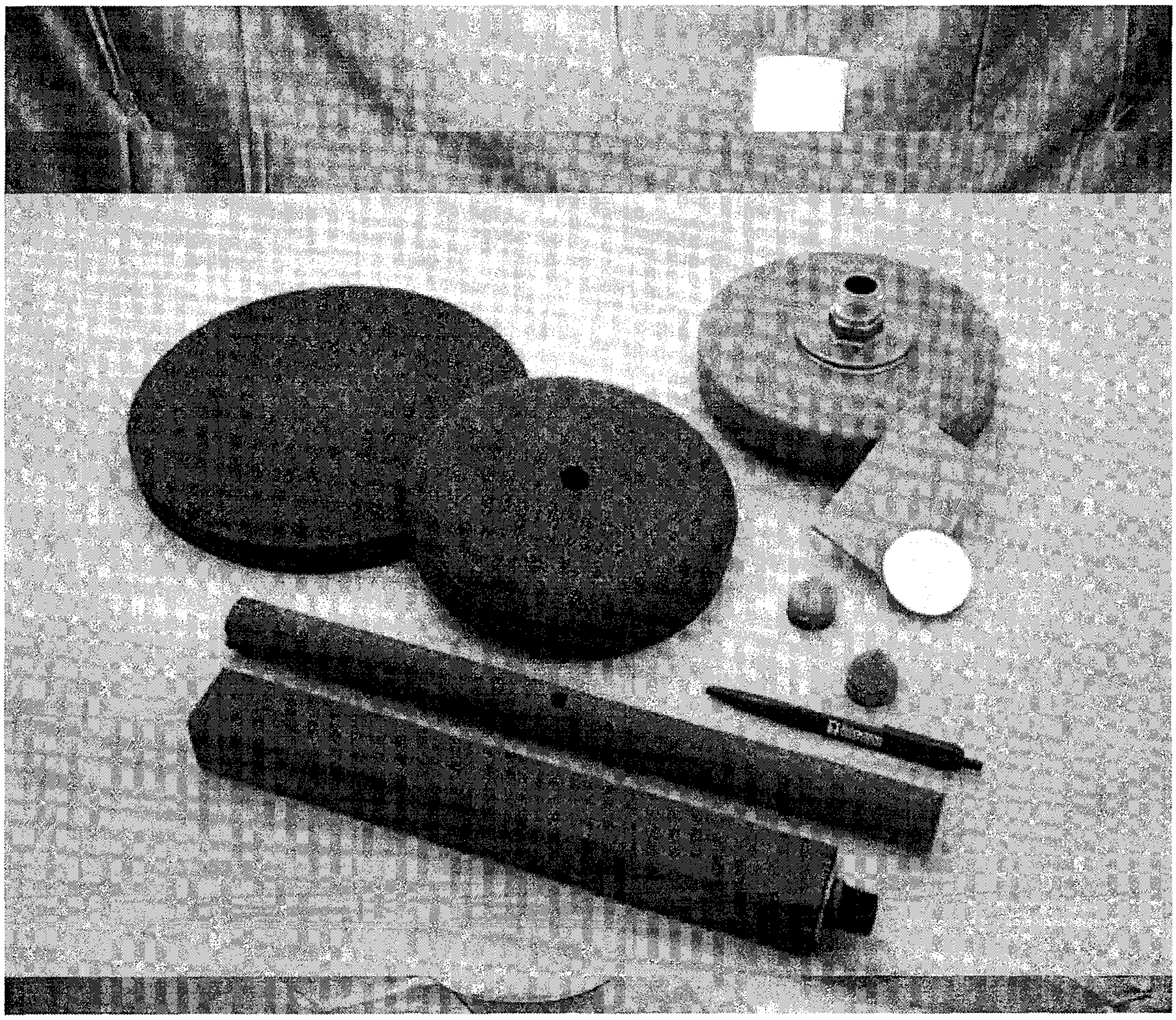
The range of Refractron porous ceramic diffusers are made by fusing aluminum oxide grains using porcelain bond to for a strong, uniformly porous and homogeneous structure. The naturally hydrophilic material is easily wetted resulting in the production of fine, uniform bubbles. Refractron's porous ceramic has 40-50% open porosity and is available in pore sizes ranging from 0.25 to 90 microns. Monolithic, single grade, aluminum oxide porous ceramic is available in 6, 15, 30, 50, 60 and 90 micron pore sizes. In addition, Refractron produces a ceramic membrane that uses a medium pore substrate with a thin coating of fine porous ceramic membrane in 0.25, 1, 3 and 6 micron pore sizes.

Porous ceramic is cleaned and reused using a variety of methods depending on the contaminant to be removed. Specifically tailored techniques include spraying, brushing, backwashing, oven firing, dilute acid cleaning, solvent cleaning plus steam and ultrasonic cleaning.

The range of porous ceramic diffusers include 2 ¾" tubes, 7" & 9" discs, 12" square plates, 7" domes, the patented Solidome TM and other custom components made from aluminum oxide where tightly controlled pore size and porosity for fine bubble production is critical. This range of diffuser product is also called air stones, bubblers, spargers and aerators. Common uses for porous ceramic diffusers include: aeration in municipal waste water plants, diffusion for chemical reactions, ozone diffusers for drinking water, oxygen diffusion, sparging in pharmaceutical process plus diffusion for aquaculture and hydroponics applications. Other specialty products include a range of adsorbent filter/drier cores for refrigeration applications, dispersion parts, vacuum chucks, inkpads and gas probes.

Porous ceramics are readily machinable using conventional diamond cutters and wheels. Since it is not ductile and the granules are removed the porous ceramic pore structure is not affected by cutting and grinding. Typical diamond tile saws are routinely used to cut porous ceramic tubes and test coupons.

We work closely with our customers to define their needs and the requirements of each specific diffuser application. Our engineering and sales team is great at attacking technical design and process problems, then customizing an innovative solution using our broad range of advanced industrial ceramics. Contact us with your application requirements.



April 10, 2008

Air Permits Initial Review Team (APIRT), MC161
Texas Commission on Environmental Quality
12100 Park 35 Circle, Building C, Third Floor
Austin, Texas 78753

LONE STAR
AIRBILL NUMBER
40402900

Reference: Registration of Permits-By-Rule
CES Environmental Services, Inc.
4904 Griggs Road
Houston, Harris County, Texas
CN600618946; RN100693282

Dear Sir or Madam:

On behalf of CES Environmental Services, Inc. (CES), please find enclosed documentation to authorize the processing of wastewater containing sulfurized isobutylene. The project qualifies for authorization under Permits-By-Rule (PBRs) §106.261, §106.262, §106.472 and §106.532.

If you have questions regarding this registration, or require further information, please do not hesitate to contact Mr. Matt Bowman of CES at (713) 676-1460, or me directly at (281) 446-7070.

Sincerely,

Philip B. Evans
Director, Technical Services

PBE/tv
26927:5330010.let.doc

Enclosure

cc: M. Bowman
L. Vasse
B. Allen

April 10, 2008

LONE STAR
AIRBILL NUMBER
40402901

Mr. John Racanelli
Revenue Section (MC-214)
Texas Commission on Environmental Quality
12100 Park 35 Circle, Building F, Room 1206
Austin, Texas 78753

Reference: CES Environmental Services, Inc.
Houston, Harris County, Texas
Registration of Permit-By-Rule §106.261
CN600618946; RN100693282

Dear Mr. Racanelli:

On behalf of CES Environmental Services, Inc. (CES), please find, enclosed, a check in the amount of $100 to cover the fee for the above referenced Permit-By-Rule (PBR) registration. A copy of the PI-7-CERT Form is also enclosed.

If you have questions regarding this registration, or require further information, please do not hesitate to contact Mr. Matt Bowman of CES at (713) 676-1460, or me directly at (281) 446-7070.

Sincerely,

Philip B. Evans
Director, Technical Services

PBE/tv
26927:5330010.let.doc

Enclosure

cc: M. Bowman
L. Vasse
B. Allen

PERMIT-BY-RULE AUTHORIZATION FOR

SIB WASTEWATER TREATMENT PROCESS

Prepared for
CES ENVIRONMENTAL SERVICES, INC.
Houston, Harris County, Texas

Prepared by
THE WCM GROUP, INC.
Humble, Texas

April 2008

PERMIT-BY-RULE AUTHORIZATION FOR

SIB WASTEWATER TREATMENT PROCESS

Prepared for
CES ENVIRONMENTAL SERVICES, INC.
Houston, Harris County, Texas

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INTRODUCTION

CES Environmental Services, Inc. (CES) operates tank container cleaning and wastewater treatment facilities at 4904 Griggs Road in Houston, Harris County, Texas (CN600618946, RN100693282) under Texas Commission on Environmental Quality (TCEQ) Permit Exemption No. 15980 and subsequent Permits-By-Rule (PBRs) Registration No. 75375, 83191 and 83798.

CES is submitting the enclosed documentation to demonstrate PBR authorization for the treatment and processing of a wastewater stream containing sulfurized isobutylene at the site. Sulfurized isobutylene wastewater (SIB) is transported to the facility in a truck tank and is pumped into a treatment tank. The SIB undergoes oxidization and acidification then chemical additions to precipitate metals, reduce BOD and suspended solids. Operational details on this operation are found in the Process Description section of this registration.

CES is located in the Houston/Galveston ozone nonattainment area and is classified as a minor source for Volatile Organic Compound (VOC) emissions. The emissions increase associated with this project is calculated as 0.38 tons per year (tpy) of VOC. As a result, the project does not trigger nonattainment netting.

A PI-7-CERT Form with TCEQ §106.4, §106.261 §106.262 and §106.472 Checklists are provided in the Forms section of this report. Emission calculations are provided in Attachment A. A topographic map, facility site plan, and process flow diagram are included in the Figures section.

1.0 PROCESS DESCRIPTION

Sulfurized isobutylene wastewater (SIB) is transported to the facility in a truck tank. This wastewater mixture is composed of water with sulfurized isobutylene and sodium salts of sodium sulfide and sodium hydroxide. The SIB mixture undergoes oxidization, acidification and chemical additions to precipitate metals and suspended solids. The material is then filtered for solid and wastewater disposal.

The percent ranges of the constituents of the received wastewater mixture are as follows: Water at 85-95%; Sulfurized Isobutylene sulfur compound at <5%; Sodium Sulfide at 1–5%; Sodium Hydrosulfide at 2–5%. Approximately 4,000 gallons of the received wastewater mixture is transferred into a wastewater treatment tank using a tank-to-tank vapor exchange. Several treatment steps occur in this tank. The first stage is oxidization of the isobutylene and sulfides with 2,400 gallon of 10% hydrogen peroxide fed at a rate of approximately 10 gallons per minute into the treatment tank. This slow transfer rate controls the heat of reaction and the oxidation rate for complete isobutylene and sulfide compound oxidation. The 10% Hydrogen Peroxide solution is pumped from a 550-gallon dilution tank supplied by a larger 5,500-gallon tank storing 35% Hydrogen peroxide. Both tanks vent to a water scrubber. The second treatment stage is acidification with approximately 220 gallons concentrated sulfuric acid (97%) added to reduce the pH from 10 su to the pH 5.0 su to facilitate solids precipitation. Sulfuric acid is supplied from a 1,000-gallon storage tank.

A vapor collection system using two 24 cfm vacuum pumps draws a negative pressure across the treatment tank capturing all vapors emitted from the transfer processes, the oxidation process and the acidification process. The vapors route to a caustic scrubber vessel where they are diffused into a sodium hydroxide solution. This scrubber then vents to the existing facility scrubber header system that consists of an 85-gallon knockout tank, two in-series 10% caustic and 5% bleach towers then finally a deodorizer tower. The vapor is exhausted with a 10 hp blower through the 30-feet tall vent stack. The overall emission control efficiency of the system is 98%.

The final stages of wastewater treatment involve the addition of ferric chloride, calcium hydroxide and anionic polymer solutions to create a filtrate ready for disposal. The oxidized and acidified solution is treated with 20 to 35 gallons of ferric chloride solution and 500 gallons of calcium hydroxide 35% solution. The vessel is then mixed thoroughly. The final treatment step adds approximately 20 to 35 gallons of an anionic polymer. With proper agitation, this final stage of chemical treatment creates the large flocculent that precipitates out solids and reduces BOD.

The precipitated mixture now moves to a sludge tank then through a filter press at a rate of approximately 50 gallons per minute. The sludge tank vents to the existing facility scrubber system. The filtrate water from the press is discharged via pipeline to an off-site POTW. The solids from the filter press are transferred into a solids bin for proper classification and disposal.

2.0 EMISSIONS SUMMARY

Emissions from the SIB wastewater processing are calculated from tank losses due to material transfers. All volatile materials are vented through a caustic scrubber. Fugitive emissions from potential leaks at valves, pumps, and connections associated with this project are calculated using the methods and emission factors specified in the TCEQ document "Air Permit Technical Guidance for Chemical Sources: Equipment Leak Fugitives". Reduction credit is taken for operations personnel monitoring the operations for leaks that can be detected with audible, visible or olfactory means. The total project increase of volatile organics is 0.38 tpy, well below the level requiring non-attainment or PSD review.

PERMIT-BY-PRULE APPLICABILITY

SUMMARY OF PROJECT CHEMICALS

CAS No.	Chemical	PBR
115-11-7	Isobutylene	106.261
772-84-1	Hydrogen peroxide	106.262
1313-82-2	Sodium Sulfide	106.472
16721-80-5	Sodium Hydrosulfide	106.472
7664-93-9	Sulfuric Acid solution	106.472
7705-08-0	Ferric chloride	106.472 / 106.532
1305-62-0	Calcium hydroxide	106.472 / 106.532
---	Polymer solution	106.532
---	Wastewater	106.532

SUMMARY OF PROJECT EQUIPMENT

Status	FIN	Description	Project Use	PBR
new	T1	10,000-gal capacity Vert Fixed Roof Tank	Treatment Tank	106.472 (2), 106.532
new	CSV	800 gal capacity Caustic diffuser scrubber vessel	vent control	106.261/106.262
new	H1	5,500-gal capacity Horz Fixed Roof Tank	Hydrogen Peroxide 35% storage	106.262
new	H2	550-gal capacity tote	Hydrogen Peroxide 10% storage	106.262
new	S	220-gal capacity Vert Fixed Roof vessel	Sulfuric Acid Storage	106.472 (5)
existing	F	19,600-gal capacity Vert Fixed Roof Tank	Ferric chloride storage	106.472 (3)/106.532
existing	C	4,000-gal capacity Vert Fixed Roof Tank	calcium hydroxide	106.472 (3)/106.532
N/A	P	55-gal drum	Polymer solution storage	106.532
existing	ST	gallon capacity Sludge tank	Waste Water separation	106.532

ATTACHMENT A

EMISSION CALCULATIONS

SUMMARY OF EMISSIONS AND PBR APPLICABILITY DOCUMENTATION

PBR 106.472

Chemical	Storage		Fugitives		Total	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Sodium Sulfide	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sodium Hydrosulfide	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sulfuric Acid	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ferric chloride	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
calcium hydroxide	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Neutralization salts	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PBR 106.261 / 106.262

Chemical	Storage		Fugitives		Total		
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	
Isobutylene	0.1147	0.3819	0.0000	0.0001	0.1147	0.3820	
Hydrogen peroxide	0.0004	0.0002	0.0011	0.0047	0.0015	0.0049	
					0.1162	**0.3870**	**TOTAL**

PBR Compliance

Chemical	Applicable PBR	TLV mg/m^3	PBR Allowable		PBR Compliance	
			lb/hr	TPY	lb/hr	TPY
Isobutylene	106.261	-	1.00	10.0	YES	YES
Hydrogen peroxide	106.262	1.4	0.009	5.0	YES	YES

PBR Allowables:

	lb/hr	ton/yr
106.261	1.0	10.0
106.262	E=L/K	5.0

L = TLV (mg/m^3)
K = 157 ,receptor distance > 270 ft

TANK EMISSION CALCULATIONS

Tank ID:		T1	H1	H2	S	F	C	T2	ST
Material:		Sulfurized Isobutylene	Hydroxide Peroxide 35%	Hydrogen Peroxide 10%	Sulfuric Acid	Ferric Chloride	Calcium Hydroxide	Treated Wastewater	Sludge/Treated Wastewater
Annual Throughput, gal/yr	Q =	832,000	582,400	499,200	45,760	6,240	104,000	1,493,440	1,493,440
Max Hourly Transfer Rate, gal/hr	FR =	4,000	1,100	550	50	50	50	50	50
Emissions:									
Maximum Hourly Emissions, lb/	**Lmax =**	**0.13528**	**0.00212**	**0.00150**	**0.00000**	**0.01551**	**0.01389**	**0.00027**	**0.00000**
Total Annual Emissions, TPY	**Lt =**	**0.45058**	**0.01807**	**0.00041**	**0.00000**	**0.00086**	**0.01052**	**0.11311**	**0.00000**
Annual Average Hourly Emis, lb/h	Lavg =	0.103	0.004	0.00009	0.000	0.000	0.002	0.026	0.000
Standing loss, lb/yr	Ls =	16.174	2.989	0.073	0.000	0.687	5.626	9.031	0.000
Working loss, lb/yr	Lw =	884.993	33.143	0.748	0.000	1.032	15.404	217.184	0.000
Material Properties:									
Molecular Weight, lb/lb-mole	Mv =	42.42	6.87	8.08	98.07	18.00	18.00	18.00	0.00
Vapor Pressure @ Tla, psia	Pva =	1.05	0.35	0.39	0.00	0.39	0.35	0.34	0.00
Vapor Pressure @ Tln, psia	Pvn =	0.93	0.29	0.33	0.00	0.33	0.29	0.29	0.00
Vapor Pressure @ Tlx, psia	Pvx =	1.19	0.41	0.46	0.00	0.46	0.41	0.40	100.00
Max. Vapor Pressure @ mTlx, psi	Pvmax =	1.67	0.59	0.71	0.00	0.72	0.65	0.64	0.00
Tank Properties:									
Vapor control device		scrubber	scrubber	scrubber	scrubber	none	none	scrubber	scrubber
Vapor control efficiency, %	e =	98	98	98	98	0	0	98	98
Capacity volume, gal	Cv =	8,272	4,888	564	940	470	4,230	8,272	940
Shell Diameter, ft	D =	8.0	8.0	4.0	4.0	4.0	12.0	8.0	4.0
Shell Height/Length, ft	Hs =	22.0	13.0	6.0	10.0	5.0	5.0	22.0	10.0
Tank Orientation (vertical or horizontal)		vert	horiz	vert	vert	vert	vert	vert	vert
Roof type (cone or dome)		cone	N/A	cone	cone	cone	cone	cone	cone
Tank Color (white, light gray, other)		white	white	white	white	white	white	white	white
Solor absorbance factor	a =	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Pressure vent setting, psig	Pbp =	0.3	0	0.3	0	0	0	0	0
Vacuum vent setting, psia	Pbv =	-0.3	0	-0.3	0	0	0	0	0
Effective diameter, ft	De =	8.0	11.5	4.0	4.0	4.0	12.0	8.0	4.0
Avg. Liquid Height, ft	Hl =	11.0	4.0	3.0	5.0	2.5	2.5	11.0	5.0
Max. Liquid Height, ft	Hlx =	22.0	8.0	6.0	10.0	5.0	5.0	22.0	10.0
Roof Outage, ft	Hro =	0.00	0.00	0.04	0.04	0.04	0.13	0.08	0.04
Vapor Space Outage, ft	Hvo =	11.00	4.00	3.04	5.04	2.54	2.63	11.08	5.04
Vapor space volume, ft^3	Vv =	552.92	416.21	38.22	63.36	31.94	296.88	557.11	63.36

Operating Conditions (Houston, Tx):									
Atmospheric pressure, psia	Pa =	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Annual Avg. Daily solar insulation	I =	1351	1351	1351	1351	1351	1351	1351	1351
Annual Avg. Daily max. ambient te	Tax =	539.1	539.1	539.1	539.1	539.1	539.1	539.1	539.1
Annual Avg. Daily min. ambient te	Tan =	517.4	517.4	517.4	517.4	517.4	517.4	517.4	517.4
Annual Avg. Daily vapor temp. rar	^Tv =	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1
Annual Daily avg. liquid surface te	Tla =	530.1	530.1	520.0	530.1	530.1	530.1	530.1	530.1
Annual Avg. Daily min. liquid surfa	Tln =	524.6	524.6	515.0	524.6	524.6	524.6	524.6	524.6
Annual Avg. Daily max. liquid surf.	Tlx =	535.6	535.6	525.0	535.6	535.6	535.6	535.6	535.6
Highest Month Daily solar insulatio	mI =	1898	1898	1898	1898	1898	1898	1898	1898
Highest Month Daily max. ambien	mTax =	553.6	553.6	553.6	553.6	553.6	553.6	553.6	553.6
Highest Month Daily min. ambient	mTan =	532.5	532.5	532.5	532.5	532.5	532.5	532.5	532.5
Highest Month Daily vapor temp. r	m^Tv =	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2
Highest Month Daily max. liquid su	mTlx =	551.7	551.7	525.0	551.7	551.7	551.7	551.7	551.7
Gas Constant, psia-ft^3/lb mole-R	R =	10.73	10.73	10.73	10.73	10.73	10.73	10.73	10.73
Vapor Density, lb/ft^3	Wv =	0.008	0.000	0.001	0.000	0.001	0.001	0.001	0.000
Daily vapor pressure range, psia	^Pv =	0.257	0.124	0.134	0.000	0.131	0.117	0.115	100.000
Vapor space expansion factor	Ke =	0.016	0.050	0.010	0.042	0.051	0.050	0.050	6.844
Vented vapor saturation factor	Ks =	0.620	0.931	0.941	1.000	0.951	0.954	0.834	1.000
Working Loss Product Factor	Kp =	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turnovers	N =	100.58	119.15	885.14	48.68	13.28	24.59	180.55	1588.83
Turnover factor	Kn =	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Operating Days, days/yr	Days =	365	365	365	365	365	365	365	365

TANK EMISSION SPECIATION

	Tank ID:	T1		H1		H2		S		F		C		T2		ST	
	EPN:	T1		H1		H2		S		F		C		T2		ST	
Stream	**wt frac.**	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Isobutylene	0.8476	0.1147	0.3819														
Sodium Sulfide(salt)	0.0000	0.0000	0.0000														
Sodium Hydrosulfide (salt)	0.0000	0.0000	0.0000														
Water	0.1524	0.0206	0.0687														
Hydrogen Peroxide 35%	0.0463			0.0001	0.0001												
Hydrogen Peroxide 10%	0.2191					0.0003	0.0001										
Sulfuric Acid	1.0000							0.0000	0.0000								
Ferric Chloride solution	0.0000									0.0000	0.0000						
water	1.0000									0.0155	0.0387						
Calcium Hydroxide	0.0000											0.0000	0.0000				
Water	1.0000											0.0139	0.0105				
Isobutylene	0.0000													0.0000	0.0000		
Hydrogen Peroxide 10%	0.0000													0.0000	0.0000		
Salts	0.0000													0.0000	0.0000		
Sulfuric Acid	0.0000													0.0000	0.0000		
Water	1.0000													0.0003	0.1131		
Neutralization salts	0.0000															0.0000	0.0000
Water	0.0000															0.0000	0.0000

Speciation	lb/hr	TPY
Isobutylene	0.1147	0.3819
Sodium Sulfide(salt)	0.0000	0.0000
Sodium Hydrosulfide (salt)	0.0000	0.0000
Hydrogen Peroxide	0.0004	0.0002
Sulfuric Acid	0.0000	0.0000
Ferric Chloride solution	0.0000	0.0000
Calcium Hydroxide	0.0000	0.0000
Neutralization salts	0.0000	0.0000
Water	0.0503	0.2310

FUGITIVE EMISSION ESTIMATES

MATERIAL	FIN	VP (psia)	Liquid wt frac.	Stream Type LL,HL,G/V	Valves	lbs/hr	Flanges	lbs/hr	Gas/Vapor Valves	lbs/hr	Gas/Vapor Flanges	lbs/hr	Pumps	lbs/hr	Relief Valves	lbs/hr	Agitator	lbs/hr	Total lb/hr	EMISSIONS (lb/hr)	EMISSIONS (ton/yr)
Isobutylene	T1	1.67428	0.0500	LL	8	0.00084	22	0.00033	0	0	0	0	1	0.002702	1	0.006879	1	0.000015	0.0005	0.0000	0.0001
Hydrogen peroxide 30%	H1	0.58773	0.3000	LL	8	0.00084	20	0.0003	0	0	0	0	1	0.002702	1	0.006879	0	0	0.0032	0.0010	0.0042
Hydrogen peroxide 10 %	H2	0.70865	0.1000	LL	16	0.00168	44	0.00066	0	0	0	0	1	0.002702	1	0.006879	1	0.000015	0.0012	0.0001	0.0005
																				0.0011	0.0049

Total is multiplied by liquid weight fraction
365 days in service

Speciation	Total lb/hr	TPY
Isobutylene	0.0000	0.0001
Hydrogen peroxide	0.0011	0.0047
Total	0.0011	0.0049

Monitoring is performed in accordance with TCEQ AVO.

SOCMI Factors	Valves	Flanges	G/V Vlv	G/V Flng	Pumps	Relief Vlv	Agitator
Light Liquid (LL)	0.0035	0.0005	--	--	0.0386	--	0.0005
Gas / Vapor (G/V)	--	--	0.0089	0.0029	--	0.2293	--
Heavy Liquid (HL)	0.0007	0.00007	--	--	0.0161	--	0.00007
LL,G/V - Efficiency (%)	97	97	97	97	93	97	97
HL - Efficiency (%)	0	0	30	30	0	0	0

* Per TNRCC guidance, fugitive emissions are not estimated for materials with vapor pressure < 0.002 psia.

FORMS

Texas Commission on Environmental Quality
Form PI-7-CERT
Certification and Registration for Permits by Rule

TCEQ

I. REGISTRANT INFORMATION			
A. TCEQ Customer Reference Number:	CN-600618946	TCEQ Regulated Entity Number:	RN-100693282
Note: If "NO," CN or RN number was entered above; please fill out the required Core Data Form, which will be available in Step II of the submittal process.			
B. Company or Other Legal Customer Name: CES Environmental Services, Inc.			
Company Official Contact Name: Matt Bowman		Title: President	
Mailing Address: 4904 Griggs Rd.			
City: Houston		State: TX	Zip Code: 77021
Phone No.: (713) 676-1460	Fax No.: (713) 676-1676	E-mail Address: mbowman@cesenvironmental.com	
C. Technical Contact Name: Philip Evans			
Company: The WCM Group, Inc.			
Mailing Address: 110 Bender Ave			
City: Humble		State: TX	Zip Code: 77336
Phone No. : (281) 446-7070	Fax No.: (281) 446-3348	E-mail Address: pevans@wcmgroup.com	
D. Facility Location Information - Street Address: 4904 Griggs Rd.			
If "NO," street address, provide written driving directions to the site: (attach description if additional space is needed)			
City: Houston	County: Harris		Zip Code: 77021

II. FACILITY AND SITE INFORMATION			
A. Name and Type of Facility: CES Environmental Services Inc.			X Permanent ☐ Portable
B. PBR claimed under **30 TAC § 106** *(List all)*:			
§ 106.261	§ 106.532		
§ 106.262	§ 106.		
§ 106.472	§ 106.		
Are you claiming a **historical standard exemption or PBR**?			☐ YES X NO
If "YES," enter effective date and Rule Number:			
C. Are you registering a **grandfathered** facility? *If "YES," attach documentation of construction date:*			☐ YES X NO
D. Is there a previous Standard Exemption or PBR for the facility in this registration? (Attach details regarding changes)			X YES ☐ NO
If "YES," enter Registration Number and Rule Number:	75375, 83191	261/262	
E. Are there any **other facilities** at this **site** which are **authorized by an Air Standard Exemption or PBR?**			☐ YES X NO
If "YES," enter Registration Number and Rule Number:			
F. Are there any **other air preconstruction permits** at this site?			☐ YES X NO
If "YES," enter Permit Numbers:			
G. Is this site required to obtain an **air federal operating permit**?			☐ YES X NO
If "YES," enter Permit Number:			
H. TCEQ Account Identification Number *(if known)*:	HG-1270-B		

Texas Commission on Environmental Quality
Form PI-7-CERT
Certification and Registration for Permits by Rule

TCEQ

III. FEE INFORMATION			
To determine if a fee is required answer the following question. If "YES," to question III. A., a fee is not required, skip to Section IV. If "NO," to answer II. A., then go to Section III. B. See Section VI. for address to send fee or go to www.2.tceq.state.tx.us/epay to pay online.			
A. Is this registration an update to a previously registered facility and accompanied by a Certification Form solely to establish a federally enforceable emission limit?			☐ YES X NO
B. What is the fee amount? *If "YES," to any of the following three questions, a **$100** fee is require. Otherwise, a **$450** fee is required.*			
Does this business have less than 100 employees?			X YES ☐ NO
Does this business have less than 1 million dollars in annual gross receipts?			☐ YES X NO
Is this registration submitted by a governmental entity with a population of less than 10,000?			☐ YES X NO
C. Check/Money Order or Transaction Number *(Payable to TCEQ)*:		*Was fee **Paid** online?*	☐ YES X NO
Company name of check:		Fee amount:	$100
IV. SELECTED FACILITY REVIEWS ONLY—TECHNICAL INFORMATION			
Note: If claiming one of the following PBRs, complete this section, then skip to Section VI., "Submitting your registration" below:			
Animal Feeding Operations § 106.161 ***Livestock Auction Facilities § 106.162*** ***Saw Mills § 106.223***			
Grain Handling, Storage and Drying § 106.283 ***Auto Body Refinishing Facilities § 106.436*** ***Air Curtain Incinerator § 106.496***			
A. Is the applicable PBR checklist attached which shows the facility meets all general and specific requirements of the PBR(s) being claimed? *(If submitting electronically, click "YES".)*			☐ YES ☐ NO
B. Distance from this facility's emission release point to the nearest property line:			feet
Distance from this facility's emission release point to the nearest off-property structure:			feet
V. TECHNICAL INFORMATION INCLUDING STATE AND FEDERAL REGULATORY REQUIREMENTS ***Registrants must be in compliance with all applicable state and federal regulations and standards to claim a PBR.***			
A. Is Confidential information submitted and properly marked "CONFIDENTIAL" with this registration?			☐ YES X NO
B. Is a process flow diagram or a process description attached?			X YES ☐ NO
C. Are emissions data and calculations for this claim attached?			X YES ☐ NO
D. Is information attached showing how the **general** requirements (**30 TAC § 106.4**) of the PBR is met for this Registration? (**PBR checklists** may be used, but are optional)			X YES ☐ NO
*Note: Please be reminded that if the facilities listed in this registration are subject to the Mass Emissions Cap & Trade program under **30 TAC Chapter 101, Subchapter H, Division 3**, the owner/operator of these facilities must possess NO_x allowances equivalent to the actual NO_x emissions from these facilities.*			
E. Is information attached showing how the **specific PBR** requirements are met for this registration? (***PBR checklist** may be used, but are optional*)			X YES ☐ NO
F. Distance from this facility's emission release point to the nearest property line:			100 feet
Distance from this facility's emission release point to the nearest off-property structure:			270 feet
Note: In limited cases, a map or drawing of the site and surrounding land use may be requested during the technical review or at the request of the TCEQ Regional Office or local air pollution control program during an investigation.			

Texas Commission on Environmental Quality
Form PI-7-CERT
Certification and Registration for Permits by Rule

TCEQ

VI. SIGNATURE FOR CERTIFICATION AND REGISTRATION	
The signature below indicates that the Responsible Official has knowledge of the facts herein set forth and that the same are true, accurate, and complete to the best of my knowledge and belief. By this signature, the maximum emission rates listed on this certification reflect the maximum anticipated emissions due to the operation of this facility and all representations in this certification of emissions are conditions upon which the facilities and sources will operate. It is understood that it is unlawful to vary from these representations unless the certification is first revised. The signature certifies that to the best of the Responsible Official's knowledge and belief, the project will satisfy the conditions and limitations of the indicated exemption or permit by rule and the facility will operated in compliance with all regulations of the Texas Commission on Environmental Quality and with Federal U.S. Environmental Protection Agency regulations governing air pollution. The signature below certifies that, based on information and belief formed after reasonable inquiry, the statements and information above and contained in the attached document(s) are true, accurate, and complete. **If you questions on how to fill out this form or about air quality permits. Please call 512/239-1250.** *Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in their information corrected. To review such information, call 512/239-3282.*	
SIGNATURE:	DATE:

VII. SUBMITTING COPIES OF THE CERTIFICATION AND REGISTRATION

Copies must be sent as listed below:
Processing delays may occur if copies are not sent as noted.

Who	***Where***	***What***
Air Permits Initial Review Team (APIRT)	Regular, Certified, Priority Mail MC161, P.O. Box 13087 Austin, Texas 78711-3087 Hand Delivery, Overnight Mail MC 161, 12100 Park 35 Circle, Building C, Third Floor Austin, Texas 78753 Fax No.: (512) 239-2123 *(do not follow fax with paper copies)*	Originals Form PI-7, Core Data Form. and all attachments
Revenue Section, TCEQ	Regular, Certified, Priority Mail MC 214, P.O. Box 13088 Austin, Texas 78711-3088 Hand Delivery, Overnight Mail MC 214, 12100 Park 35 Circle, Building A, Third Floor Austin, Texas 78753	Original Money Order or Check Copy of Form PI-7 and Core Data Form
Appropriate TCEQ Regional Office	To find your Regional Office address, go to the TCEQ Web site at www.tceq.state.tx.us, or call (512) 239-1250.	Copy of Form PI-7, Core Data Form, and all attachments.
Appropriate Local Air Pollution Control Program(s)	To Find your local or Regional Air Pollution Control Programs go to the TCEQ, APD Website at www.tceq.state.tx.us/nav/permits/air_permits.html or call (512) 239-1250	Copy of Form PI-7, Core Data Form, and all attachments.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
AIR PERMITS DIVISION

TITLE 30 TAC § 106.4 "QUICK-CHECK" APPLICABILITY CHECKLIST

Company Name: CES Environmental Services, Inc.
Checklist completed by: The WCM Group, Inc. Date: 04/09/2008
Facility Type: Tank Spot Vessel Cleaning & Waste Processing
Permit(s) by rule claimed: 30 TAC Chapter §106: 261, 262, 472, 532
Project Description (including equipment, materials, and brief process description):

This project installs a treatment tank and associated chemical storage vessels to process a sulfurized isobutylene wastewater stream through oxidation, acidification and chemical treatment. The settled solution is then separated for solid and liquid disposal.

CO	0.00	NO_X	0.00	VOC	0.38
PM	0.00	SO_2	0.00	Other (H_2O_2)	0.005

The following questions require a "Yes" or "No" answer to be indicated for this permit by rule claim:

A. Title 30 TAC § 106.4(a)(5): Current Permit by Rule Requirements

Yes X No☐ Have you checked to determine if this exempt project is being claimed under the current version of 30 TAC 106?
If "Yes ", continue to next question If "No ", please contact the Air Permits Division for a copy of the current permit by rule to be claimed.

B. Title 30 TAC § 106.4(a)(7): Permit by rule prohibition check

Yes☐ No X Are there any air permits under the same account containing permit conditions which prohibit or restrict the use of permits by rule?
If "No ", continue to next question
If "Yes ", permits by rule may not be used or their use must meet the restrictions of the permit.
A new permit or permit amendment may be required.
List permit number(s): ______

C. Title 30 TAC § 106.4(b): Circumvention check

Title 30TAC§ 106.4(b) states "No person shall circumvent by artificial limitations the requirements of§l 16.110 of this title (covering permitting)." Circumvention by artificial limitations may include but is not limited to:

A. dividing a complete project into separate segments to circumvent §106.4(a)(l) limits;
B. claimingfeed or production rates below the physical capacity of the project's equipment in order to begin constructingfacilities before a permit or permit amendment is approvedfor full scale operations, particularly when the unit will not be economically viable at less than permitted capacity;
C. claiming a limited chemical list in order to begin constructingfacilities before a permit or permit amendment is approved for additional chemicals, particularly when the unit will not be economically viable until the additional chemicals are authorized.

Yes☐ No X Does your project meet any of the criteria listed above?
If "No ", continue to next rule question If "Yes ", a permit y rule may not be claimed.

D. Title 30 TAC § 106.4(c) and (d): Compliance with all Rules

Yes X No☐ Will the facility comply with all rules and regulations of the TCEQ, the intent of the Texas Clean Air Act, and any local permitting or registration requirements? *If "Yes ", continue to next rule question If "No ", a permit by rule may not be claimed.*

E. Title 30 TAC § 106.4(a)(l): Emission limits check

Yes X No☐ The maximum emissions from all facilities at the site, including this permit by rule claim, are less than 25 tpy of any contaminant.
If the answer to this questions is "Yes ", no further review is needed to complete this checklist. Forward all information needed to verify your permit by rule claim to the . If "No ", this checklist cannot be used. Please complete the standard 30 TAC § 106.4 Applicability Checklist.

Title 30 Texas Administrative Code § 106.261
Permit By Rule (PBR) Checklist
Facilities (Emission Limitations)

TCEQ

Electronic Submittal - Only enter the PI-7 confirmation number here [ ] if submitting electronically.
Hard-Copy Submittal - Print and complete the following checklist.

The following checklist is designed to help you confirm that you meet Title 30 Texas Administrative Code § 106.261 (30 TAC § 106.261) requirements. If you do not meet all the requirements, you may alter the project design or operation in such a way that all the requirements of the PBR are met or you may obtain a construction permit. The PBR forms, tables, checklists and guidance documents are available from the Texas Commission on Environmental Quality (TCEQ), Air Permits Division Web site at, www.tceq.state.tx.us/nav/permits/air_permits.html.

CHECK THE MOST APPROPRIATE ANSWER		
	Is a description or checklist of how this claim meets the general requirements for the use of PBRs in 30 TAC § 106.4 attached?	X YES ☐ NO ☐N/A
b1	Is this claim for construction of a facility authorized in another section of this chapter or for which a standard permit is in effect? *If "YES," this PBR cannot be used to authorize emissions from the project*	☐ YES X NO ☐N/A
b2	Is this claim for any change to any facility authorized under another section of this chapter or authorized under a standard permit? *If "YES," this PBR cannot be used to authorize emissions from the project*	☐ YES X NO ☐N/A
a1	Are facilities or changes located at least 100 feet from any recreational area or residence or other structure not occupied or used solely by the owner or operator of the facilities or the owner of the property upon which the facilities are located?	X YES ☐ NO ☐N/A
a2	Are total new or increased emissions, including fugitives, less than or equal to 6.0 pounds per hour (lb/hr) and ten tons per year of the following materials (check all that apply):	☐ YES ☐ NO X N/A

☐ acetylene	☐ helium	☐ propyl ether	☐ limestone
☐ argon	☐ isohexane	☐ sulfur dioxide	☐ magnesite
☐ butane	☐ isopropyl alcohol	☐ alumina	☐ marble
☐ crude oil	☐ methyl acetylene	☐ calcium carbonate	☐ pentaerythritol
☐ carbon monoxide	☐ methyl chloroform	☐ calcium silicate	☐ plaster of paris
☐ cyclohexane	☐ methyl cyclohexane	☐ cellulose fiber	☐ silicon
☐ cyclohexene	☐ neon	☐ cement dust	☐ silicon carbide
☐ cyclopentan	☐ nonan	☐ emery dust	☐ starch
☐ ethyl acetate	☐ oxides of nitrogen	☐ glycerin mist	☐ sucrose
☐ ethanol	☐ propane	☐ gypsum	☐ zinc stearate
☐ ethyl ether	☐ propyl alcohol	☐ iron oxide dust	☐ zinc oxide
☐ ethylene	☐ propylene	☐ kaolin	

☐ refinery petroleum fractions (except for pyrolysis naphthas and pyrolysis gasoline) containing less than ten volume percent benzene
☐ fluorocarbons Numbers 11, 12, 13, 14, 21, 22, 23, 113, 114, 115, and 116

a3	Are total new or increased emissions, including fugitives, less than or equal to 1.0 lb/hr of any chemical having a limit value (L) greater than 200 milligrams per cubic meter (mg/m^3) as listed and referenced in Table 262 of 30 TAC § 106.262 of this title (relating to Facilities (Emission and Distance Limitations)? List chemical:_______ L value:_____________	☐ YES ☐ NO X N/A
	Are total new or increased emissions, including fugitives, less than or equal to 1.0 lb/hr of any chemical not listed or referenced in Table 262? List chemical:___isobutylene_______________	X YES ☐ NO ☐ N/A

	Are total new or increased emissions, including fugitives,of a chemical with a limit value of less than 200 mg/m^3? If "Yes" the authorization of the chemical is not allowed under this section. We suggest you use 30 TAC §106.262 to authorize the emissions, if applicable.	☐ YES ☐ NO X N/A
a4	Are there any changes to or additions of any existing air pollution abatement equipment?	☐ YES X NO ☐N/A
a5	Will there be any visible emissions, except uncombined water, emitted to the atmosphere from any point or fugitive source in amounts greater than 5.0% opacity in any six-minute period?	☐ YES X NO ☐N/A
a6	Are emission increases five tons per year or greater? If "YES," this checklist must be attached to a Form PI-7 within ten days following the installation or modification of the facilities. The notification shall include a description of the project, calculations, data identifying specific chemical names, limit values, and a description of pollution control equipment, if any.	☐ YES X NO ☐N/A
a7	Are emission increases less than five tons per year? If "YES," this checklist must be attached to a Form PI-7 and include a description of the project, calculations, data identifying specific chemical names, limit values, and a description of pollution control equipment, if any. (pick one): X Within ten days following the installation or modification of the facilities. The notification shall include a description of the project, calculations, data identifying specific chemical names, limit values, and a description of pollution control equipment, if any; or ☐ By March 31 of the following year summarizing all uses of this permit by rule in the previous calendar year.	X YES ☐ NO ☐N/A

TCEQ

Title 30 Texas Administrative Code § 106.262
Permit by Rule (PBR) Checklist
Facilities (Emission and Distance Limitations)

Electronic Submittal - Only enter the PI-7 confirmation number here if submitting electronically.
Hard-Copy Submittal - Print and complete the following checklist.
The following checklist is designed to help you confirm that you meet Title 30 Texas Administrative Code § 106.262 (30 TAC § 106.262) requirements. If you do not meet all the requirements, you may alter the project design or operation in such a way that all the requirements of the PBR are met or you may obtain a construction permit. The PBR forms, tables, checklists and guidance documents are available from the Texas Commission on Environmental Quality (TCEQ), Air Permits Division Web site at, www.tceq.state.tx.us/nav/permits/air_permits.html.

CHECK THE MOST APPROPRIATE ANSWER				
	Is a description or checklist of how this claim meets the general requirements for the use of PBRs in 30 TAC § 106.4 attached?	X YES	❑ NO	❑ N/A
b1.	Is this claim for construction of a facility authorized in another section of this chapter or for which a standard permit is in effect? *If "YES," this PBR cannot be used to authorize emissions from the project.*	❑ YES	X NO	❑ N/A
b2.	Is this claim for any change to any facility authorized under another section of this chapter or authorized under a standard perm? *If "YES," this PBR cannot be used to authorize emissions from the project.*	❑ YES	X NO	❑ N/A
c.	Is the facility authorized under another section of this chapter or under a standard permit? *If "YES," subsection (a)(2) and (3) of this section may be used to qualify the use of other chemicals at the facility.*	X YES	❑ NO	❑ N/A
a1.	Are facilities or changes located at least 100 feet from any recreational area or residence or other structure not occupied or used solely by the owner or operator of the facilities or the owner of the property upon which the facilities are located?	X YES	❑ NO	❑ N/A
a2.	Are new or increased emissions, including fugitives, emitted in a quantity less than five tons per year or in a quantity less than E as determined by using the equation E=L/K? See Table 262 Figures 1 and 2. *If "YES," the notification shall include a description of the project, calculations for all emissions being claimed under this PBR:*	X YES	❑ NO	❑ N/A
	Chemical:__hydrogen peroxide__ L value:____1.4 _______ D:______270 ________ K:____157_______			
a3.	Is this checklist attached to a Form PI-7 within ten days following the installation or modification of the facilities? *If "YES," the notification shall include a description of the project, calculations, and data identifying specific chemical names, L values, and a description of pollution control equipment, if any..*	X YES	❑ NO	❑ N/A
a4.	Are one or more of the following chemicals is handled for this registration? (Check all that apply) *If "YES," answer the following four questions.*	❑ YES	X NO	❑ N/A

❑ acrolein	❑ diazomethane	❑ hydrogen sulfide	❑ ozone
❑ allyl chloride	❑ diborane	❑ ketene	❑ pentaborne
❑ ammonia (anhydrous)	❑ diglycidyl ether	❑ methylamine	❑ perchloromethyl mercaptan
❑ arsine	❑ dimethylhydrazine	❑ methyl bromide	❑ perchloryl fluoride
❑ boron trifluoride	❑ ethyleneimine	❑ methyl hydrazine	❑ phosgene
❑ bromine	❑ ethyl mercaptan	❑ methyl isocyanate	❑ phosphine
❑ carbon disulfide	❑ fluorine	❑ methyl mercaptan	❑ phosphorus trichloride
❑ chlorine	❑ formaldehyde (anhydrous)	❑ nickel carbonyl	❑ selenium
❑ chlorine dioxide	❑ hydrogen bromide	❑ nitric acid	❑ hexafluoride stibine
❑ chlorine trifluoride	❑ hydrogen chloride	❑ nitric oxide	❑ liquefied sulfur dioxide
❑ chloroacetaldehyde	❑ hydrogen cyanide	❑ nitrogen dioxide	❑ sulfur pentafluorid
❑ chloropicrin	❑ hydrogen fluoride	❑ oxygen difluoride	❑ tellurium hexafluoride
❑ chloroprene	❑ hydrogen selenide		

Title 30 Texas Administrative Code § 106.262
Permit by Rule (PBR) Checklist
Facilities (Emission and Distance Limitations)

	Are all facilities are located at least 300 feet from the nearest property line and 600 feet from any off-plant receptor?	❑ YES	❑ NO	❑ N/A
	Are the cumulative amount of any of the following chemicals resulting from one or more authorizations under this section (but not including permit authorizations) less than or equal to 500 pounds on the plant property?	❑ YES	❑ NO	❑ N/A
	Are all listed chemicals handled only in unheated containers operated in compliance with the United States Department of Transportation regulation (49 Code of Federal Regulation, Parts 171-178)?	❑ YES	❑ NO	❑ N/A
	Are any changes to or additions of any existing air pollution abatement equipment?	❑ YES	❑ NO	❑ N/A
a5.	Are there any changes to or additions of any existing air pollution abatement equipment?	❑ YES	❑ NO	❑ N/A
a6.	Will there be any visible emissions, except uncombined water, emitted to the atmosphere from any point or fugitive source in amounts greater that 5.0% opacity in any six-minute period?	❑ YES	❑ NO	❑ N/A

D, Feet	K	
100	326	E=maximum allowable hourly emission, and never to exceed 6 pounds per hour.
200	200	
300	139	
400	104	
600	65	
700	54	
800	46	K=value from the table on this page. (interpolate intermediate values)
900	39	
1,000	34	
2,000	14	D=distance to the nearest off-plant receptor
3,000 or more	8	

TABLE 262
LIMIT VALUES (L) FOR USE WITH EXEMPTIONS FROM PERMITTING § 106.262

The values are not to be interpreted as acceptable health effects values relative to the issuance of any permits under Chapter 116 of this title (relating to Control of Air Pollution by Permits for new Construction or Modification).

Compound	Limit (L) Milligrams Per Cubic Meter
Acetone	590.
Acetaldehyde	9.
Acetone	4.
Acetonitrile	34.
Acetylene	2662.
N-Amyl Acetate	2.7
Sec-Amyl Acetate	1.1
Benzene	3.
Beryllium and Compounds	0.0005
Boron Trifluride, as HF	0.5
Butyl Alcohol,	76.
Butyl Acrylate	19.
Butyl Chromate	0.01
Butyl Glycidyl Ether	30.
Butyl Mercaptain	0.3
Butyraldehyde	1.4
Butyric Acid	1.8
Butyronitrile	22.
Carbon Tetrachloride	12.
Chloroform	10.
Chlorophenol	0.2
Chloroprene	3.6
Chromic Acid	0.01
Chromium Metal, Chromium II and III Compounds	0.1
Chromium VI Compounds	0.01
Coal Tar Pitch Volatiles	0.1
Creosote	0.1
Cresol	0.5
Cumene	50.
Dicyclopentadiene	3.1
Diethylaminoethanol	5.5
Diisobutyl Ketone	63.9
Dimethyl Aniline	6.4
Dioxane	3.6

Compound	Limit (L) Milligrams Per Cubic Meter
Dipropylamine	8.4
Ethyl Acrylate	0.5
Ethylene Dibromide	0.38
Ethylene Glycol	26.
Ethylene Glycol Dinitrate	0.1
Ethylidene 2-norbornene, 5-	7.
Ethyl Mercaptan	0.08
Ethyl Sulfide	1.6
Glycolonitrile	5.
Halothane	16.
Heptane	350.
Hexanediamine, 1, 6-	0.32
Hydrogen Chloride	1.
Hydrogen Fluoride	0.5
Hydrogen Sulfide	1.1
Isoamyl Acetate	133.
Isoamyl Alcohol	15.
Isobutyronitrile	22.
Kepone	0.001
Kerosene	100.
Malononitrile	8.
Mesityl Oxide	40.
Methyl Acrylate	5.8
Methyl Amyl Ketone	9.4
Methyl-T-Butyl Ether	45.
Methyl Butyl Ketone	4.
Methyl Disulfide	2.2
Methylenebis (2-chloroaniline) (MOCA)	0.003
Methylene Chloride	26.
Methyl Isoamyl Ketone	5.6
Methyl Mercaptan	0.2
Merthyl Methacrylate	34.
Methyl Propyl Ketone	530.
Methyl Sulfide	0.3
Mineral Spirits	350.
Naphtha	350.
Nickel, Inorganic Compounds	0.015
Nitroglycerine	0.1

Compound	Limit (L) Milligrams Per Cubic Meter
Nitropropane	5.
Octane	350.
Parathion	0.05
Pentane	350.
Perchloroethylene	33.5
Petroleum Ether	350.
Phenyl Mercaptan	0.4
Propionitrile	14.
Propyl Acetate	62.6
Propylene Oxide	20.
Propyl Mercaptan	0.23
Silica-amorphous-precipitated, silica gel	4.
Silicon Carbide	4.
Stoddard Solvent	350.
Styrene	21.
Succiononitrile	20.
Tolidin	0.02
Trichloroethylene	135.
Trinethylamine	0.1
Valeric Acid	0.34
Vinyl Acetate	15.
Vinyl Chloride	2.

NOTE: The time weighted average (TWA) threshold Limit Value (TLV) published by the American Conference of Governmental Industrial Hygienists (AGGIH), in its TLVs and BEIs guide (1997 Edition) shall be used for compounds not included in the table. The Short Term Exposure Level (STEL) or Ceiling Limit (annotated with a "C") published by the ACGIH shall be used for compounds that do not have a published TWA TLV. This section cannot be used if the compound is not listed in the table or does not have a published TWA TLV, STEL, or Ceiling Limit in the ACGIH TLVs and BEIs guide.

Texas Commission on Environmental Quality

Exemption §106.472 Checklist
(Previously Standard Exemption 51)

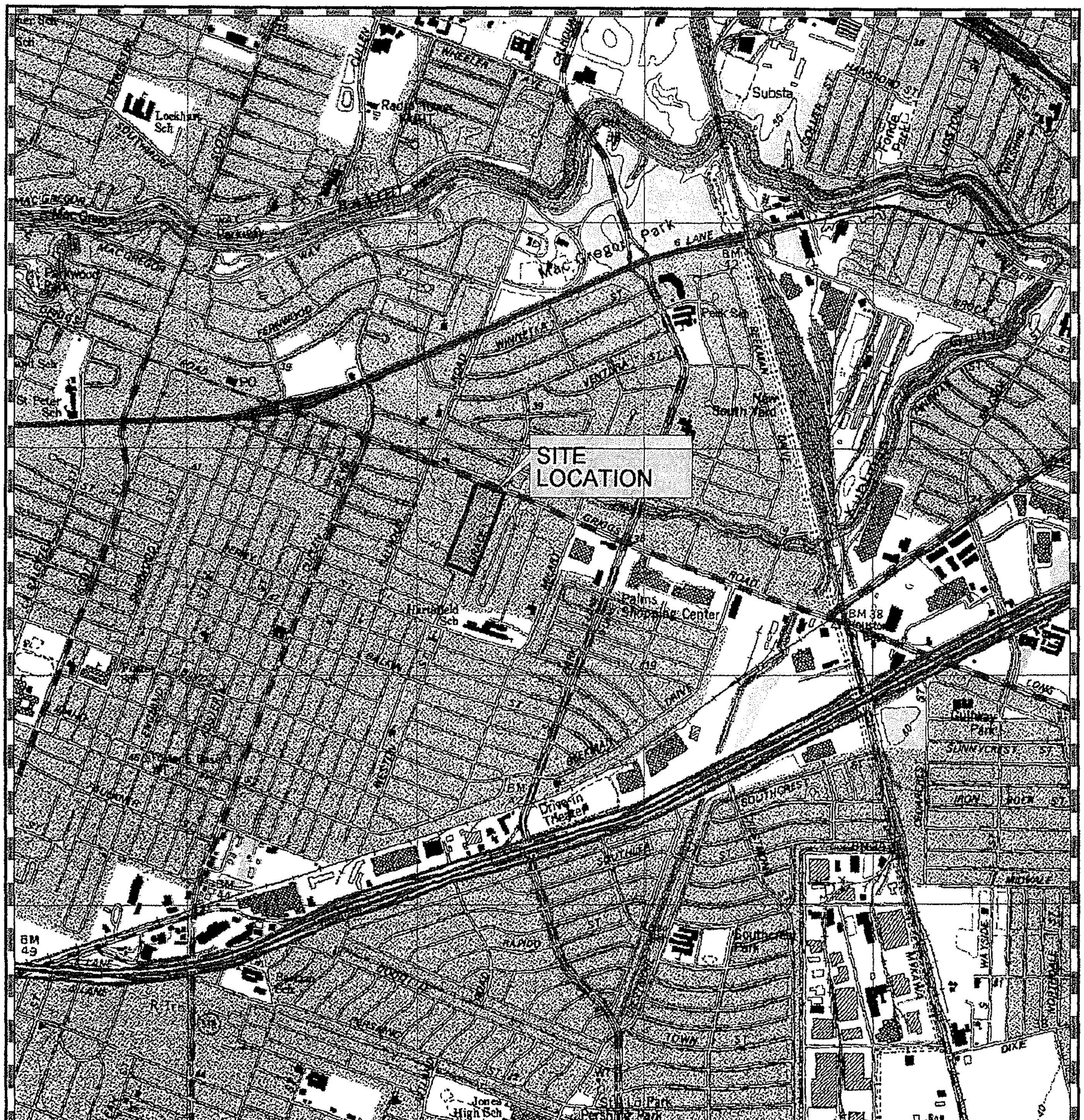
Organic Liquid Loading and Unloading

The following checklist is designed to help you confirm that you meet §106.472, previously Standard Exemption 51 (STDX 51), requirements. **Any "no" answers indicate that the claim of registration may not meet all requirements for the use of Exemption §106.472, previously Standard Exemption 51.** If you do not meet all the requirements, you may alter the project design/operation in such a way that all the requirements of the exemption are met, or obtain a construction permit.

YES	NO	NA	DESCRIPTION
X	_	_	Have you included a description of how this exemption claim meets the general rule for the use of exemptions (§106, Subchapter A checklist is available)?
X	_	_	Are all the facilities claimed for exemption specifically named in the general section of §106.472, previously STDX 51? (This exemption has been interpreted to allow mixing or blending but not chemical reaction in tankage.)
X	_	_	Is the equipment designed to prevent visible emissions?
X	_	_	Are all the chemicals to be loaded, unloaded, or stored described in §106.472, previously STDX 51(a) - (i)? Attach a list of the chemicals and identify the appropriate item of §106.472, previously STDX 51 that applies. Include additional supporting data. For example, a §106.472, previously STDX 51(i), claim should identify initial boiling points of all compounds to be covered.
_	_	X	Will aqueous ammonia solutions, hydrochloric acid, or acetic acid be vented through a water scrubber?
_	_	X	Are facilities loading, unloading, or storing butyric acid, isobutyric acid, methacrylic acid, mercaptans, croton oil, 2-methyl styrene, or any other compound with an initial boiling point of 300 degrees F or greater listed in 40 CFR 261, Appendix VIII, located at least 500 feet from any recreational area or residence or other structure not occupied or used solely by the owner or operator of the facility or the owner of the property upon which the facility is located? List these compounds and show their handling location on an attached scaled plot plan.

FIGURE 1

TOPOGRAPHIC MAP



1320 0 1320
1:24,000 1" = 2000 feet feet

TOPOGRAPHIC MAP

CES ENVIRONMENTAL SERVICES, INC.

4904 GRIGGS ROAD

HOUSTON, HARRIS COUNTY, TEXAS

North

FIGURE

1

ENVIRONMENTAL PROFESSIONALS

WCM

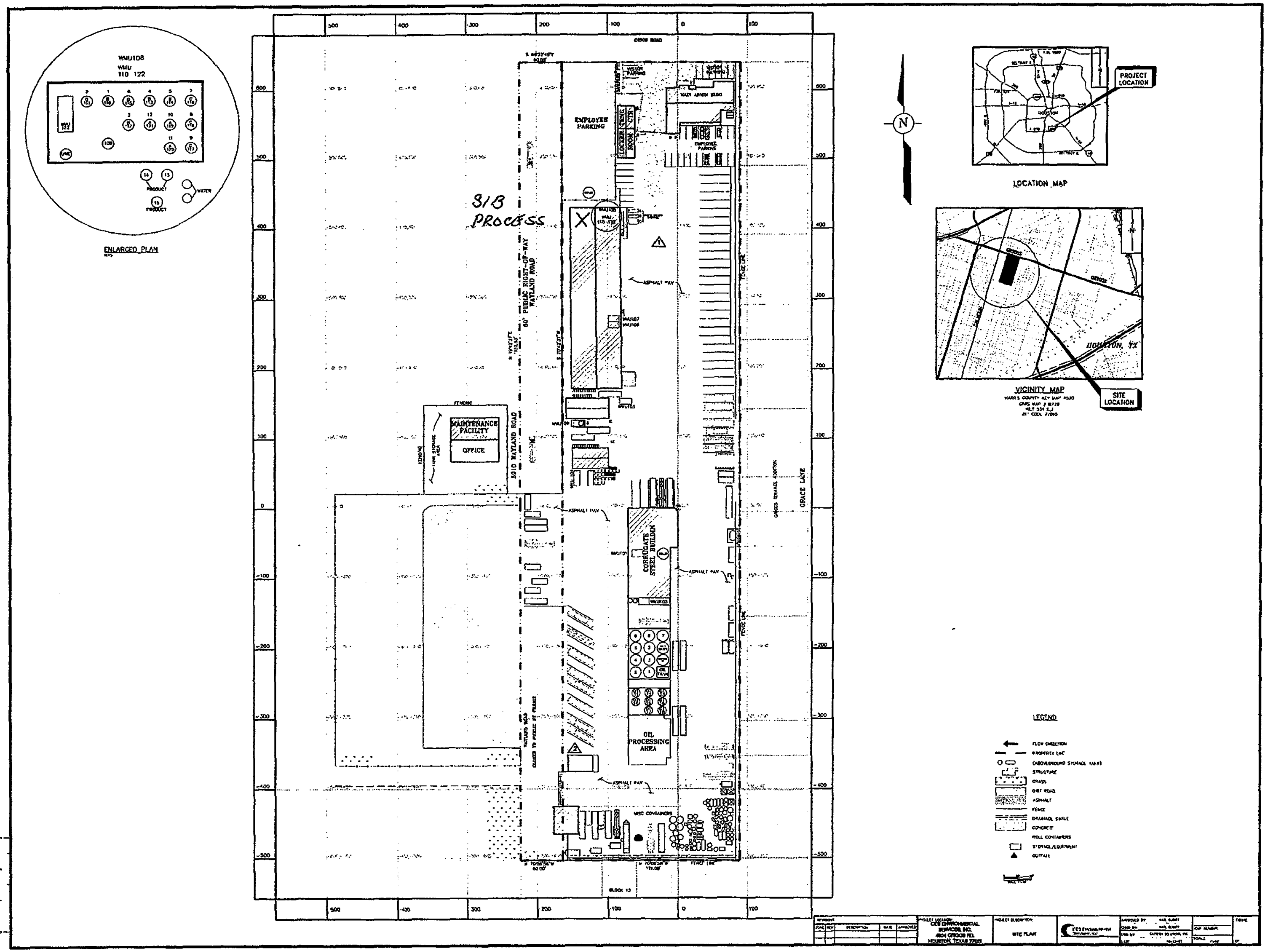
Reproduced from U.S. Topographic Quadrangle: Park Place Texas; Zone 15

DRAWN BY: LLS DATE: 04-10-2008

FILE: H:-client-CES-Houston site.geo

FIGURE 2

FACILITY SITE PLAN



EPAHO113001557

FIGURE 3

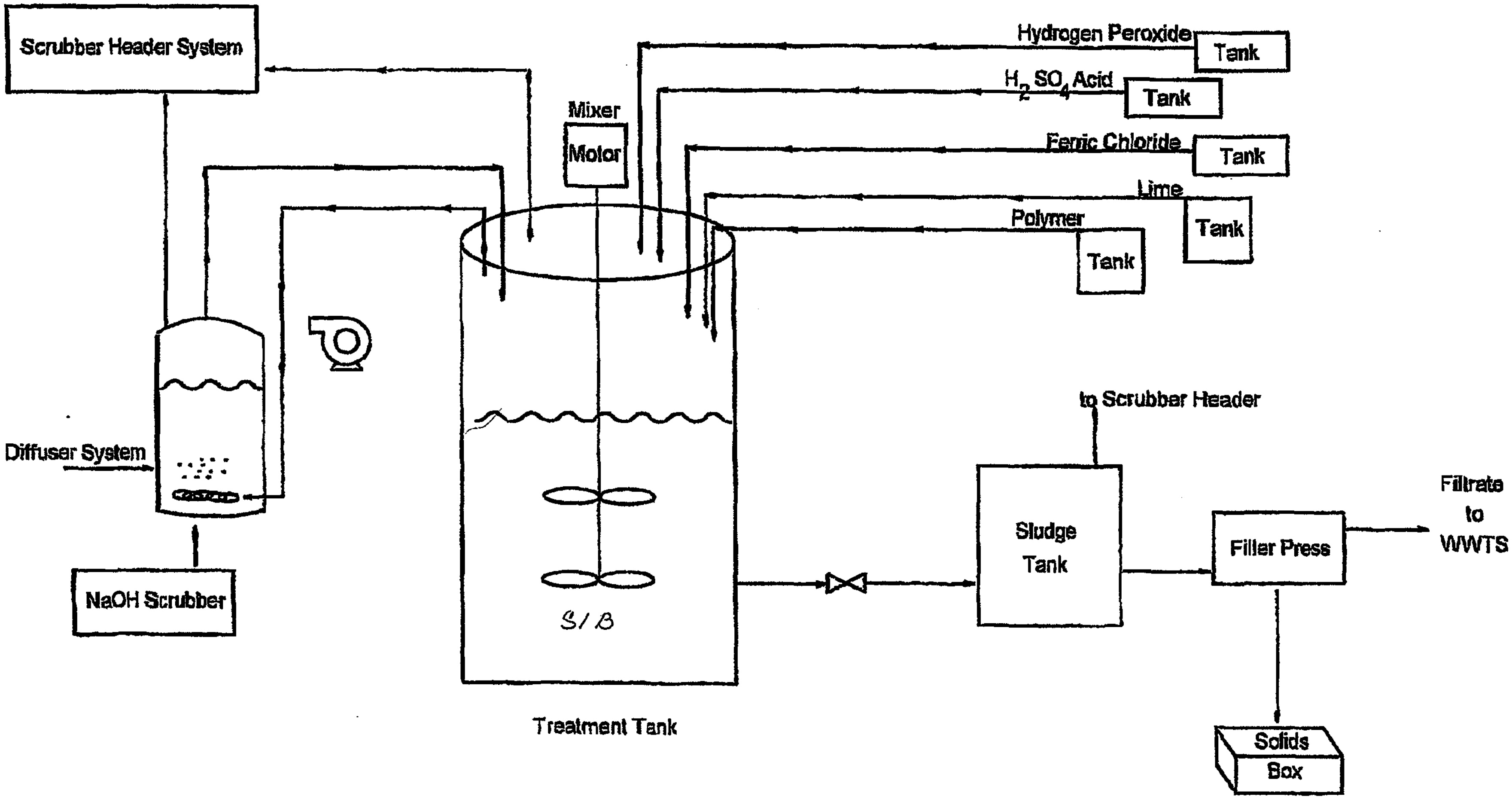
PROCESS FLOW DIAGRAM

CES Environmental Services, Inc .

SIB Rinse Water Treatment

Process Flow Diagram

March 28, 2008



Gary Peterson

From: Gary Peterson
Sent: Monday, April 14, 2008 5:19 PM
To: Marlin Moser
Subject: RE: SIB PBR , 4-14-2008

Marlin,

PBR Corrections:

Page 1 after the introduction:

1. The listing for the addition rates of some of the treatment chemicals and for some of the volume's list a specific number. I think they should all cover an approximate range for a rate and for volume.
   a. H2O2 should be : approximately 5-8 gallons per minute
   b. Approximately 20 - 35 gallons of ferric chloride
   c. Approximately 300 – 500 gallons of calcium hydroxide of a 28 – 35% slurry concentration.
   d. Approximately 150 – 350 gallons of sulfuric acid

Page 3 after the introduction:

2. Hydrogen sul is not mentioned. I figured this is because of the oxidation step and therefore not needed.
3. Some tanks do not have capacities listed and one is incorrect
   a. Caustic diffuser: 800 gallon capacity
   b. WRONG, Ferric chloride lists a capacity of 19,600 gal Vert Fixed Roof Tank
   c. Need the capacity of the sludge tank

In Attachment A again for emissions there is not a mention of hydrogen sul and probably due to the oxidation treatment step. In page 1 of attachment A the very bottom K variable in the equation E=L/K looks like it is a constant and does not have any units, 157. This may be correct but it does not look right to me for some reason.

FORMS

I reviewed the forms package. A lot of this information I will just have to assume is OK.

1. Page 2 for the checklist for Title 30 TAC 106.262 does not have any items checked for Yes, No or N/A. Probably at least one of the choices need to be identified for each of the line items.

Process Flow Diagram

The treatment tank has a different mixing and agitation system now with the pump mixing addition. Also the agitator arm only has one mixing blade arrangement.

I did not see any mention of any carbon canister treatment unit mentioned that you talked about.

This is all that I could see.

From: Marlin Moser
Sent: Monday, April 14, 2008 9:00 AM
To: Gary Peterson; Karl Guidry; Matt Bowman; Greg Bowman
Subject: FW: SIB PBR

Look this over because it needs to be submitted to the State in 5 days.

From: Philip Evans [mailto:pevans@wcmgroup.com]
Sent: Friday, April 11, 2008 8:41 AM
To: Marlin Moser

Cc: Connie A. Harrison
Subject: RE: SIB PBR

Marlin,

Please find attached the draft PBR Registration package for the SIB process. Please review the draft and contact me with any questions or changes. If the document meets with your approval, please sign the last page of the PI-7-CERT form and return the original signature page to me for inclusion in the final submittal. As done for previous PBR registrations, we will prepare the registration fee check and forward the package to TCEQ with copies to you and the local agency.

Thanks,
Phil

From: Marlin Moser [mailto:mmoser@cesenvironmental.com]
Sent: Thursday, April 10, 2008 12:55 PM
To: Philip Evans
Subject: SIB PBR

Phil,

Is the PBR done?

Marlin

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 5-3-08 JOB Number (or other type of information): Job # 62251

Customer, Product Description, Other Information trailer 638035

PRODUCT : SIB

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide ppm	Mercaptan ppm	Other	Other
1.036	12.50	22,980	67,400		

OTHER INFORMATION: 38,320 pounds ; 11.35 #'s gallon
Gallons = 3,376

STARTING VOLUME: 200ml

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
		Gallons	1
		844	2
		1,182	3
			4
		304	5
			6
			7
			8
			9
		8 gal	10
			11
			12
	103 gal	~~306~~ gal	13
			14
			15
			16
		17	17
			18
			19
			20
			21

PROCESSING NOTES:

25% H_2O_2 50ml 126°F Not Violent
35% H_2O 70ml

ACID ~~5ml~~
~~10ml~~ 146°F pH= 9 14ml = 4.0
99% ~~15ml~~ pH = 2.86
~~16ml~~ pH = 2.24 creamy orange starting
~~17ml~~ pH = 1.94 Oil remains on top Oil must be removed.
18ml pH = 1.66

.35% Ferric .5ml

Caustic (50%) ~~2ml~~ pH = 2.6
~~4ml~~ pH = 3.83
3.05% ~~5ml~~ pH = 4.79 6.1ml
~~6ml~~ pH = 7.88 6.2 pH = 9.5
6.5ml pH = 12.10

.5% Poly 1ml

Solid = 10%

Product Processing Log Sheet, Edited, MASTER, 5-1-2008 GRP

EPAHO113001562

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 5-1-08 JOB Number (or other type of information): Trailer 124223

Customer, Product Description, Other Information

PRODUCT : SIB

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other
	11.82	18,360	90,640		

Product Physical Characteristics

OTHER INFORMATION: 2% Oil layer

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
			1
			2
			3
			4
			5
			6
			7
			8
			9
			10
			11
			12
			13
			14
			15
			16
			17
			18
			19
			20
			21

PROCESSING NOTES:

CES Environmental Services, Inc. SHIPPED

PRODUCT PROCESSING DATA REPORT

Date: 5-1-08 JOB Number (or other type of information): trailer LT-638

Customer, Product Description, Other Information

PRODUCT : SLB

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other
	11.86	16,680	116,230		

Product Physical Characteristics

OTHER INFORMATION:

STARTING VOLUME: 200

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

			1
			2
			3
			4
			5
			6
			7
			8
			9
			10
			11
			12
			13
			14
			15
			16
			17
			18
			19
			20
			21

PROCESSING NOTES:
→ 25% (10% conc.) H_2O_2 – 50 ml
→ 35% water – 70 mls

Acid

Product Processing Log Sheet, Edited, MASTER, 5-1-2008

GRP

EPAHO113001564

CES Environmental Services, Inc.

.0553 wt
EQP 1 1.296146 ml
2 1.791894
3 1.744831

PRODUCT PROCESSING DATA REPORT

Date: 5-1-08 JOB Number (or other type of information): trailer 210

Customer, Product Description, Other Information

PRODUCT : SIB

	Density (S.G.)	Boiling Point (F,C) / pH	LT-635 3rd Sulfide 18,790	5:40 pm Mercaptan 102,520	Other	Other
	1.38	11.95 ~~11.85~~	~~[illegible]~~	~~[illegible]~~		

OTHER INFORMATION: 2% Oil layer

1.38 × 8.34 ⇒ 11.51#/gal, 44,360#'s = 3854 gallons

STARTING VOLUME: 200

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
	3,854 Gallons		1
		25%	2
Gallons	964	35%	3
	1,349		4
			5
			6
			7
			8
			9
	501 gal		10
			11
			12
		11.5 gal	13
			14
		144 gal	15
			16
			17
		17 gal	18
			19
			20
			21

PROCESSING NOTES:

25% H_2O_2 (10%) — 50 ml
35% H_2O — 70 ml

ACID ~~10 ml~~
~~15 ml~~
20 ml pH = 4
22 ml creamy orange - then the acid digests the mercaptans - 1% then turns opaque orange pH = 3
~~12.5%~~
13.0% 23 ml ~~pH 2.35~~ pH = 2.85
24 ml - pH = 2.90
24.5 ml - pH = 2.82 ; 25.0 ml = pH = 2.4
26 ml pH = 1.67

Feric .6 ml .3%

NaOH ~~4 ml~~ pH = 3
~~7 ml~~ pH = 7
7.5 ~~8 ml~~ pH = 9.0
3.75%

Poly .9 ml .45%

Solids = 22.5% = $\boxed{45\%}$

SIB Hazardous Wastewater TREATMENT PROCESSING

5-2-2008 **TRAILER 210**

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 62707

Manifest Number: 004014065 JJK

Trailer Number: 210

Gallons: 3,854; 44,360 pounds ALL TREATMENT VOLUMES BASED ON THIS QUANTITY

pH= 11.95 , density = 1.38

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

For the pH target the pH is 1.8 (range 1.6 -1.9). MAKE SURE THE TARGET PH IS MET, THIS IS A CRITICAL PART OF TREATMENT. It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.

PLEASE FOLLOW ALL TREATMENT AND PROCESSING PRECAUTIONS PREVIOUSLY ESTABLISHED FOR THE REACTIONS INVOLVED IN THE TREATMENT AND HANDLING OF THIS MATERIAL.

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK.

NOTE: ALL GALLON VOLUMES ARE BASED ON A PERCENTAGE BY TREATMENT. THE VOLUMES IN THE TANK MAY NOT BE EXACT. BECAUSE OF THIS WHEN AROUND 75% OF THE REQUIRED STATED TREATMENT VOLUMES LISTED BELOW ARE REACHED START ADDING THE TREATMENT CHEMICALS SLOWLY AND BY SMALL ADDITIONAL VOLUMES. THIS IS VERY IMPORTANT TO TREAT THE SIB MATERIAL CORRECTLY AND PRODUCE A QUALITY TREATED WATER.

1. ***PEROXIDE & WATER ADDITION*** : *964 (25% BY VOLUME)* gallons of 10% CONCENTRATION hydrogen peroxide; 1,349 gallons of water *(35% BY VOLUME)* (TOTAL peroxide & water equal approximately 60% of the received volume of SIB). **During this part of the treatment process the temperature can reach as high as 180 degrees F,** *ADD WITH CAUTION; THE PEROXIDE REACTION CAN BE VERY VIOLENT IF ADDED TO FAST, REDUCE GPM TO 3 GPM OR LOWER IF NECESSARY.* The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ***ACID ADDITION*** : ***pH TARGET = 1.8*** ADD 501 GALLONS (approximately, 13 % of the received volume of SIB) OF SULFURIC ACID. The gallon volume required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS). HEAVY SOLIDS START FORMING

AROUND A PH OF 9 & CONTINUE TO FORM UNTIL A PH OF AROUND 4 IS REACHED. ACID ADDITION slow gpm & WELL MIXING IN THE TANK IS CRITICAL AND VERY IMPORTANT AT THIS STAGE OF TREATMENT. **The acid treatment pH target point is a pH of 1.8 su (RANGE 1.6 – 1.9).** ***The sulfides at the target pH (1.8) will be driven off to the scrubber; this may just take a little more mixing & process scrubbing time.*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 1.9 pH, 1.6 – 2.0 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. ADD Approximately 11.5 GALLONS OF FERRIC CHLORIDE **, DO NOT ADD SO MUCH FERRIC CL SO THE MATERIAL TURNS BLACK. YOU DO NOT NEED THIS MUCH FERRIC. ADD A COUPLE OF GALLONS AND THEN CHECK THE TANK. THEN ADD SLOWLY, 1/2 GALLON AT A TIME FROM THEN ON.** **Ferric Chloride** addition. Add a total volume of ferric chloride to be **.1 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. **SODIUM HYDROXIDE ADDITION (50% CONCENTRATION):** ADD 144 GALLONS OF SODIUM HYDROXIDE caustic, **TARGET PH IS 9.0** (approximately, 3.75 % of the received volume of SIB), gradually add lime and check the pH and color until you reach the target pH. **The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.** Proceed to step 5.

5. **<u>ADD 17 GALLONS OF POLYMER (approximately, .45 % of the received volume of SIB).</u>** ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Test for pH, sulfides, mercaptans, TOC and metals (THE QUICK ammonia TEST shows high ppm of ammonia, the waste stream only has about 28 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **<u>The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.</u>** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

The Solids FORMED WITH USING CAUSTIC (SODIUM HYDROXIDE) are with this batch are high, 45 % not back calculated to the original volume.

Gary Peterson

From: Gary Peterson
Sent: Thursday, May 01, 2008 11:11 AM
To: Marlin Moser; Bo Cumberland; Brian Weathers
Cc: Matt Bowman
Subject: SIB Trailer status and trailers to be Treated (I have samples of all of these), 5-1-2008

The following SIB trailers shave been sampled for specialty system processing, These should not be brought into the bay for treatment and processing.

1. 2815
2. 638035
3. 255
4. 239
5. 241

The following three SIB trailers shave been sampled for specialty treatability processing. **These three trailers listed below ARE NOT TO BE SENT ANYWHERE. <u>AT THIS TIME THESE ARE GOING TO BE PROCESSED HERE AND A WORKUP IS CURRENTLY BEING GENERATED ON THE MATERIAL FROM THESE TRAILERS.</u>**

1. **210**
2. **LT-638**
3. **124223**

<u>Trailers listed as 1 and 3 (210 and 1242230 have 2% of a top organic oil present in the load. This should require addition surcharges to load these two trailers a decant offloading will be required.</u>

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

Gary Peterson

From: Gary Peterson
Sent: Wednesday, April 30, 2008 4:50 PM
To: Matt Bowman
Cc: Miles Root; Marlin Moser
Subject: SIB Testing, 4-30-2008

The following trailers were sampled:

1. 2815
2. 638035
3. 255
4. 239
5. 241

A composite of these trailers was made and a series of testing was completed on the composite. The material is not a known composition consisting of Sodium hydroxide, sodium hydrosulfide and sodium sulfide only. Part of the material composition consists of low percent levels of sulfur compounds. Because of the variance of the composition of the sulfur compounds present a true Sodium Hydrosulfide Analytical Procedure (A,B,C test) cannot be run. The following testing data has been generated on this material.

1. pH = 12.42
2. Density = 1.37
3. Acid Base Titration using 0.01 N HCL – The weight percent of Base compounds titrated as NaOH is 6.28%. The weight percent as Na is 3.61%
4. Sulfide Potentiometric Titration using 0.05 N AgNO3 – The weight percent of Sulfide compounds titrated as S is 3.98%. The weight percent of Sulfide compounds titrated as RSH is 3.63%

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

Gary Peterson

From: Gary Peterson
Sent: Tuesday, April 29, 2008 12:06 PM
To: Marlin Moser; Bo Cumberland; Brian Weathers; Matt Bowman; Ryan Thomas
Subject: SIB Trailer Status
Attachments: 1 SIB Trailer Load STATUS Sheet, 4-29-2008.xls

Attached. All of the trailers listed on the spreadsheet indicated as "on the line" or "NEXT" should all be currently loaded with SIB. These trailers should not be considered as trailers available for transportation at this time.

I am doing the treatment on trailer 1264. That is the last SIB trailer I have a sample of that needs a treatment workup.

Please arrange to have the following trailers sampled for treatment workup.

1. 2815
2. 638035
3. 255
4. 239
5. 241

SAMPLE SIB

Other than the list above, there are three more SIB loaded trailers remaining to be sampled, these are 210, LT-638 and 124223.

If any of these trailers are scheduled for any other type of CES system processing please let me know so I can keep the log sheet up to date.

2 qts EACH

Thanks.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

Tracking:

Gary Peterson

From: Gary Peterson
Sent: Tuesday, April 29, 2008 12:06 PM
To: Marlin Moser; Bo Cumberland; Brian Weathers; Matt Bowman; Ryan Thomas
Subject: SIB Trailer Status
Attachments: 1 SIB Trailer Load STATUS Sheet, 4-29-2008.xls

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Please arrange to have the following trailers sampled for treatment workup.

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2. 638035
3. 255
4. 239
5. 241

Other than the list above, there are three more SIB loaded trailers remaining to be sampled, these are 210, LT-638 and 124223.

If any of these trailers are scheduled for any other type of CES system processing please let me know so I can keep the log sheet up to date.

Thanks.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

Tracking:

Recipient	Read
Marlin Moser	
Bo Cumberland	
Brian Weathers	
Matt Bowman	
Ryan Thomas	Read: 4/29/2008 12:07 PM

Gary Peterson

From: Gary Peterson
Sent: Monday, April 28, 2008 7:07 PM
To: Marlin Moser; Brian Weathers; Bo Cumberland; Matt Bowman
Subject: SIB Batch trailer 124238-2, 4-28-2008
Attachments: SIB, BATCH TRAILER 124238-2 Treatment Processing, 4-28-2008.doc

Attached treatment.

The trailer after that will be;

1. Trailer 1264 (41,080 pounds, 3,582 gallons)

Please sample the following trailers. Bring two sample of each trailer. Label the sample correctly.

1. 2815
2. 638035

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

Gary Peterson

From: Gary Peterson
Sent: Monday, April 28, 2008 12:34 PM
To: Marlin Moser; Bo Cumberland; Brian Weathers
Cc: Sam Brown; Godefroy Gbery
Subject: SIB trailers needing sampling.; 4-28-2008

Please sample the following trailers. Bring two sample of each trailer. Label the sample correctly.

1. 1264
2. 2815
3. 638035

The next trailer after that will be;

1. Trailer 124238-2 (only listed as 3,000 gallons) (THIS SHOULD BE STRAPPED)
2. Trailer 1264 (41,080 pounds, 3,582 gallons)

These two trailers have been sampled and the workup has been started. Please do not send these trailers anywhere.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

Gary Peterson

From: Gary Peterson
Sent: Monday, April 28, 2008 9:49 AM
To: Marlin Moser; Brian Weathers; Bo Cumberland
Cc: Matt Bowman
Subject: SIB treat, Trailer 124223-2, 4-26-08
Attachments: SIB, BATCH TRAILER 124223-2 Treatment Processing, 4-26-2008.doc

The attachment is the treatment for the above subject.

The next trailer after that will be;

1. Trailer 124238-2 (only listed as 3,000 gallons) (THIS SHOULD BE STRAPPED)
2. Trailer 1264 (41,080 pounds, 3,582 gallons)

These two trailers have been sampled and the workup has been started. Please do not send these trailers anywhere.

Thanks

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

CES Environmental Services, Inc.

4/24/2008 STATUS

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

	LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	STATUS
1	~~1~~	~~4/8/08~~	~~004013923 JJK~~	~~638035-0~~	~~61849~~	~~34,400~~	**PROCESSED**
2	~~2~~	~~4/11/08~~	~~004014541 JJK~~	~~124223-2~~	~~62045~~	~~4,320~~	**PROCESSED**
4	~~3~~	~~4/13/08~~	~~004014604 JJK~~	~~638035~~	~~62246~~	~~41,520~~	**PROCESSED (4-21-08)**
5	4	~~*4/14/08*~~	~~*004014605 JJK*~~	~~255~~	~~*62247*~~	~~*47,320*~~	PROCESSED (4-24-08)
6	~~5~~	~~[illegible]/14/08~~	~~0040146[illegible]~~	~~*12* [illegible] *1*~~	~~*62260*~~	~~*3,122 (calculated)*~~	~~**PROCESSED (4-24-08)**~~
→	~~6~~	~~04/14/08~~	~~**004014609** [illegible]~~	~~L[illegible]38~~ 1	~~62261~~	2,544 (calculated)	**NEXT- Beng ~~Sampled~~ 4-24-08**
3	~~7~~	~~04/14/08~~	~~004014610 JJK~~	~~124238-2~~	~~62262~~	~~45,000~~	~~**PROCESSED**~~
8 →	8	04/15/08	004014645 JJK	124238-2 3	62248	29,940 ~~3,000~~ 2,619	On the line NEXT
7	9	~~04/16/08~~	~~00401671 JJK~~	~~124223-2~~ ~~2~~ 1	~~**62351**~~ Dow=	~~41,080~~	~~On the line~~ NEXT
	10	04/16/08	004014672 JJK	1264 4	**62352**	47,260	On the line
	11	04/17/08	00414696 JJK	2815 5	**62250**	48,480	On the line
	12	04/18/08	004014841 JJK	638035 6	**62251**	38,320	On the line

SIB STATUS Load Receipt and Processing Data Sheet, 4-24-2008

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	STATUS
13	4/22/08	004014981 JJK	255	62704	37,020	On the line
14	4/23/08	004014001 JJK	239	62705	48,000	On the line
15	4-24	004014017 JJK	241	62706	5,303	
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

SIB STATUS Load Receipt and Processing Data Sheet, 4-24-2008

CES Environmental Services, Inc.

4-22-2008
~~4/18/2008~~ STATUS

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

	LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	STATUS
1	~~1~~	~~4/8/08~~	~~004013923 JJK~~	~~638035-0~~	~~61849~~	~~34,400~~	**PROCESSED**
2	~~2~~	~~4/11/08~~	~~004014541 JJK~~	~~124223-2~~	~~62045~~	~~4,320~~	**PROCESSED**
4	~~3~~	~~4/13/08~~	~~004014604 JJK~~	~~638035~~	~~62246~~	~~41,520~~	**PROCESSED (4-21-08)**
5	4	***4/14/08***	***004014605 JJK***	***255***	***62247***	***47,320***	***PROCESSING NOW***
Processed 4-24	5	***4/14/08***	***004014606 JJK***	***124221-1***	***62260***	***3,122 (calculated)***	~~*NEXT*~~ 4-24 Done
	6	04/14/08	004014609 JJK	LT-638	62261	2,544 (calculated)	On the line
3	~~7~~	~~04/14/08~~	~~004014610 JJK~~	~~124238-2~~	~~62262~~	~~45,000~~	**PROCESSED**
	8	04/15/08	004014645 JJK	124238-2	62248	3,000	On the line
	9	04/16/08	00401671 JJK	124223-2	**62351**	41,080	On the line
	10	04/16/08	004014672 JJK	1264	**62352**	47,260	On the line
	11	04/17/08	00414696 JJK	2815	**62250**	48,480	On the line
	12	04/18/08	004014841 JJK	638035	**62251**	38,320	On the line

SIB STATUS Load Receipt and Processing Data Sheet, 4-22-2008

EPAHO113001580

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	STATUS
13	4/22/08	004014981 JJK	255	62704	37,020	On the line
14	4-23	004014001 JJK	239	62705	48,010	" "
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

SIB STATUS Load Receipt and Processing Data Sheet, 4-22-2008

[redacted]

3/28/08

"RT Wash Containers / Trailers on Site"

Plant 1 → ① ✓ 3/17 1) ANCU-638035-0 ✓ ~34400# (JF)

Plant 2 → ② ① ✓ 3/18 2) GSIU-124238-2 ✓ ~33920# (JP/
(Carrier signed he had 102600 10:25 AM - per Sign in log.)

~~Plant 2~~ ③ → ③ ✓ 3/17 3) GSIU-124223-2 ✓ ~44782# (JF)

④ ✓ 3/24 4) GSIU-124221-1 ✓ ~41280# (DT/J

⑤ ✓ 3/22 SAT 5) T/T LT 638 ✓ ~40,363# (PT)

½ RTW ½ oil → N ✓ 3/24 ~~6) T/T LT 848 ✓ ~18920#~~ (JT)
(Light ??)
Oil + Water per Bill 3/31/08

6 ✓ 3/27 7) SCZU 876641-6 ✓ ~35360# (Gil/J

?

RT-Wash Containers Cont...

⑦ ✓ 4/1 ⑨ GSIU-124105-1 - 41,160 lbs
⑧ ✓ 4/1 ⑩ T/T LT 423 - 41,780 lbs

Gary Peterson

From: Gary Peterson
Sent: Friday, April 18, 2008 4:15 PM
To: Chris Saylor
Cc: Darrin Raymond; Ryan Thomas; Marlin Moser
Subject: RE: SIB Processing Status

Thanks Chris.

From: Chris Saylor
Sent: Friday, April 18, 2008 2:56 PM
To: Gary Peterson
Cc: Darrin Raymond; Ryan Thomas; Marlin Moser
Subject: RE: SIB Processing Status

= 3,122 gal

LT-638

GARY HEAVY WEIGHT FOR JOB NUMBER 62261 IS 75020 — 75020 - 40,363 = 34,657 #'s
HEAVY WEIGHT FOR JOB NUMBER 62260 IS 69520 ~~1~~ 124221-1 69520 - 41280 = 28,240 #'s
THANKS ANY QUESTIONS LET ME KNOW

2,544

Chris Saylor
Logistics Manager
CES Environmental Services, Inc
4904 Griggs Rd
Houston, TX 77021
Office: 713-676-1460
Cell: 713-825-8326
Fax: 713-676-1676
csaylor@cesenvironmental.com

From: Gary Peterson
Sent: Friday, April 18, 2008 1:02 PM
To: Marlin Moser; Bo Cumberland; Brian Weathers; Chris Saylor; Darrin Raymond
Cc: Ryan Thomas; Matt Bowman; Greg Bowman; Sam Brown; Godefroy Gbery
Subject: SIB Processing Status

I have continued to maintain the SIB Receipt and Processing Data spread sheet. I think this will help maintain a better handle on the details regarding loads received, loads processed and next load to process information. In time when we are caught up and have worked out the kinks of this processing this may not be needed. For the time being I think it is necessary to maintain the quality and accuracy of disposal processing and operations.

Chris and Darrin: There are two loads on the spreadsheet where there was not a quantity indicated on the manifest. This information is needed. Would you please send the information to me. This is needed information for processing. Thanks.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

CES Environmental Services, Inc.

4/18/2008 STATUS

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	STATUS
~~1~~	1 ~~4/8/08~~	~~004013923 JJK~~	~~638035-0~~	~~61849~~	~~34,400~~	**PROCESSED**
~~2~~	2 ~~4/11/08~~	~~004014541 JJK~~	~~124223-2~~	~~62045~~	~~4,320~~	**PROCESSED**
4 ~~3~~	8 ~~4/13/08~~ 4-12	~~004014604 JJK~~	~~638035~~ 4-21- DOWN	~~62246~~	~~41,520~~	**PROCESSED**
5 4	NEXT 4/14/08	4-21-08 ~~4-19-08~~ 004014605 JJK	255	62247	47,320 1.33 11.10 #/gal 4,264 gallons	On the line
6 5.52 Oil 5	4-21-08 4/14/08 Oil	004014606 JJK	~~124221-1~~	62260	**NO QUANTITY**	On the line
6	04/14/08	004014609 JJK	LT-638	62261	**NO QUANTITY**	On the line
3 ~~7~~	4 ~~04/14/08~~	~~004014610 JJK~~	~~124238-2~~	~~62262~~	~~45,000~~	**PROCESSED**
8	04/15/08	004014645 JJK	124238-2	62248	3,000	On the line
9	04/16/08	00401671 JJK	124223-2	**62351**	41,080	On the line
10	04/16/08	004014672 JJK	1264	**62352**	47,260	On the line
11	04/17/08	00414696 JJK	2815	**62250**	48,480	On the line
~~12~~	~~04/18/08~~	004014841 JJK	638035	**62251**	38,320	On the line

SIB STATUS Load Receipt and Processing Data Sheet, 4-18-2008

EPAHO113001584

CES Environmental Services, Inc.

4/18/2008 STATUS

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	STATUS
~~1~~	~~4/8/08~~	~~004013923 JJK~~	~~638035-0~~	~~61849~~	~~34,400~~	**PROCESSED**
~~2~~	~~4/11/08~~	~~004014541 JJK~~	~~124223-2~~	~~62045~~	~~4,320~~	**PROCESSED**
~~3~~	~~4/13/08~~ 4-17	~~004014604 JJK~~	~~638035~~	~~62246~~	~~41,520~~	**PROCESSED**
~~4~~	~~4/14/08~~ 4-21-08	~~004014605 JJK~~	~~255~~	~~62247~~	~~47,320~~	~~On the line~~
5	4/14/08 ~~4-21-08~~	004014606 JJK	124221-1	62260	**NO QUANTITY**	On the line
6	04/14/08	004014609 JJK	LT-638	62261	**NO QUANTITY**	On the line
~~7~~	~~04/14/08~~	~~004014610 JJK~~	~~124238-2~~	~~62262~~	~~45,000~~	**PROCESSED**
8	04/15/08	004014645 JJK	124238-2	62248	3,000	On the line
9	04/16/08	00401671 JJK	124223-2	**62351**	41,080	On the line
10	04/16/08	004014672 JJK	1264	**62352**	47,260	On the line
11	04/17/08	00414696 JJK	2815	**62250**	48,480	On the line
12	04/18/08	004014841 JJK	638035	**62251**	38,320	On the line

SIB STATUS Load Receipt and Processing Data Sheet, 4-18-2008

Gary Peterson

From: Chris Saylor
Sent: Friday, April 18, 2008 2:56 PM
To: Gary Peterson
Cc: Darrin Raymond; Ryan Thomas; Marlin Moser
Subject: RE: SIB Processing Status

GARY HEAVY WEIGHT FOR JOB NUMBER 62261 IS 75020
HEAVY WEIGHT FOR JOB NUMBER 62260 IS 69520
THANKS ANY QUESTIONS LET ME KNOW

Chris Saylor
Logistics Manager
CES Environmental Services, Inc
4904 Griggs Rd
Houston, TX 77021
Office: 713-676-1460
Cell: 713-825-8326
Fax: 713-676-1676
csaylor@cesenvironmental.com

From: Gary Peterson
Sent: Friday, April 18, 2008 1:02 PM
To: Marlin Moser; Bo Cumberland; Brian Weathers; Chris Saylor; Darrin Raymond
Cc: Ryan Thomas; Matt Bowman; Greg Bowman; Sam Brown; Godefroy Gbery
Subject: SIB Processing Status

I have continued to maintain the SIB Receipt and Processing Data spread sheet. I think this will help maintain a better handle on the details regarding loads received, loads processed and next load to process information. In time when we are caught up and have worked out the kinks of this processing this may not be needed. For the time being I think it is necessary to maintain the quality and accuracy of disposal processing and operations.

Chris and Darrin: There are two loads on the spreadsheet where there was not a quantity indicated on the manifest. This information is needed. Would you please send the information to me. This is needed information for processing. Thanks.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

EPAHO113001586

CES Environmental Services, Inc.

GARY

4/15/2008 STATUS

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

	LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	STATUS
✓ DONE	~~1~~	~~4/8/08~~	**004013923 JJK**	**638035-0**	**61849**	**34,400**	~~**PROCESSED**~~
✓	2 DONE	~~4/11/08~~	~~004014541 JJK~~	~~124223-2~~	~~62045~~	~~4,320~~	~~On the line~~ Processed
✓ 4-17-08	3	~~4/13/08~~	~~004014604 JJK~~	~~638035~~	~~62246~~	~~41,520~~	~~On the line~~ Pr
	4	4/14/08	004014605 JJK	255	62247	47,320	On the line
	5	4/14/08	004014606 JJK	124221-1	62260	NO QUANTITY	On the line
	6	4/14/08	004014609 JJK	LT-638	62261	NO QUANTITY	On the line
✓	**7** DONE	~~**4/14/08**~~	~~**004014610 JJK**~~	~~**124238-2**~~	~~**62262**~~	~~**45,000**~~	**PROCESSED**
	8	4-15-08	004014645 JJK	124238-2	62248	3,000	on the line
	9	~~4-15-08~~ 4-16-08	004014671 JJK	124223-2	62351	41080	on the line
	10	4-~~17~~16	004014672 JJR	1264 ~~6235~~	62352	47,260	on t L
	11	4-17	004014696 JJR	2815	~~4~~62250	48,480	" "
	12	4-18	004014891 JJR	638035	62251	38320	on t L

EPAHO113001587

CES Environmental Services, Inc.

4/15/2008 STATUS

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	STATUS
1	**4/8/08**	**004013923 JJK**	**638035-0**	**61849**	**34,400**	**PROCESSED**
2	4/11/08	004014541 JJK	124223-2	62045	4,320	On the line
3	4/13/08	004014604 JJK	638035	62246	41,520	On the line
4	4/14/08	004014605 JJK	255	62247	47,320	On the line
5	4/14/08	004014606 JJK	124221-1	62260	NO QUANTITY	On the line
6	4/14/08	004014609 JJK	LT-638	62261	NO QUANTITY	On the line
7	**4/14/08**	**004014610 JJK**	**124238-2**	**62262**	**45,000**	**PROCESSED**

CES Environmental Services, Inc.

4/15/2008 STATUS

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	STATUS
1	**4/8/08**	**004013923 JJK**	**638035-0**	**61849**	**34,400**	**PROCESSED**
2	4/11/08	004014541 JJK	124223-2	62045	4,320	On the line
3	4/13/08	004014604 JJK	638035	62246	41,520	On the line
4	4/14/08	004014605 JJK	255	62247	47,320	On the line
5	4/14/08	004014606 JJK	124221-1	62260	NO QUANTITY	On the line
6	4/14/08	004014609 JJK	LT-638	62261	NO QUANTITY	On the line
7	**4/14/08**	**004014610 JJK**	**124238-2**	**62262**	**45,000**	**PROCESSED**

CES Env... nmental Services, Inc.

WW INCOMING TANK TRUCK WATER TESTING DATA LOG SHEET

DATE	TIME	Initials	Trailer Number	Customer Job Number	TESTING TYPE & RESULTS (must test pH & TOC on every sample)	WRITE in this COLUMN ALL INFO. that could be important	LEAD OPER. CALLED CHECK
DATE 4-11-08	TIME 10:00	Initials GAP	Trailer Number ISO 124223-2	KMCO SIB 62045 Profile no.: 2696	pH= TOC= Phenol= METALS= EMULSION: YES NO Other TREAT or Test Info.?	PFI Reviewed YES NO Problems ? TOTAL GALLONS= 4,320	
DATE 4-14-08	TIME 0700	Initials GAP	Trailer Number 255	KMCO SIB 62247 Profile no.: 2696	pH= TOC= Phenol= METALS= EMULSION: YES NO Other TREAT or Test Info.?	PFI Reviewed YES NO Problems ? TOTAL GALLONS=	
DATE 4-14-08	TIME 0600	Initials GAP	Trailer Number 124221 -1	KMCO SIB 62260 Profile no.: 2969	pH= TOC= Phenol= METALS= EMULSION: YES NO Other TREAT or Test Info.?	PFI Reviewed YES NO Problems ? TOTAL GALLONS=	
DATE 4-14-08	TIME 2nd	Initials GAP	Trailer Number LT638	KMCO SIB 62261 Profile no.: 2696	pH= TOC= Phenol= METALS= EMULSION: YES NO Other TREAT or Test Info.?	PFI Reviewed YES NO Problems ? TOTAL GALLONS=	
DATE 4-14-08	TIME 3rd	Initials GAP	Trailer Number 124238-2	KMCO SIB 62262 Done Profile no.: 2696	pH= TOC= Phenol= Done METALS= EMULSION: YES NO Other TREAT or Test Info.?	PFI Reviewed YES NO Problems ? TOTAL GALLONS=	
DATE 4-13-08	TIME	Initials GAP	Trailer Number 638035	KMCO 62246 Profile no.: 2696	pH= TOC= Phenol= METALS= EMULSION: YES NO Other TREAT or Test Info.?	PFI Reviewed YES NO Problems ? TOTAL GALLONS=	
DATE	TIME	Initials	Trailer Number	Profile no.:	pH= TOC= Phenol= METALS= EMULSION: YES NO Other TREAT or Test Info.?	PFI Reviewed YES NO Problems ? TOTAL GALLONS=	

CES Environmental Services, Inc.

WW INCOMING TANK TRUCK WATER TESTING DATA LOG SHEET

DATE	TIME	Initials	Trailer Number	Customer Job Number	TESTING TYPE & RESULTS (must test pH & TOC on every sample)	WRITE in this COLUMN ALL INFO. that could be important	LEAD OPER. CALLED CHECK ✓
DATE 4-14	TIME 4:20	Initials SB	Trailer Number ~~252~~ 270	[redacted] GATX [redacted] 62234 1383 Profile no.: [illegible]	pH= 9 TOC= Phenol= 0 METALS= EMULSION: YES NO Other TREAT or Test Info.?	PFI Reviewed YES NO Problems ? C TOTAL GALLONS= 5800	✓
DATE 4.14	TIME 4:25	Initials S.B	Trailer Number ~~244~~ 241	EnterPRise ~~62~~62053 Profile no.: 2680	pH= TOC= Phenol= METALS= EMULSION: YES NO Other TREAT or Test Info.?	PFI Reviewed YES NO Problems ? TOTAL GALLONS= 393	✓
DATE 4-14	TIME 6:00	Initials GG	Trailer Number 228	LAbarge 62277 Profile no.: 2857	pH= 9 TOC= 1451 Phenol= 0 METALS= EMULSION: YES NO Other TREAT or Test Info.?	PFI Reviewed YES NO Problems ? A TOTAL GALLONS= 5000	✓
DATE 4-14	TIME 6:07	Initials GG	Trailer Number 254	Proler 62032 Profile no.: 1443	pH= 9 TOC= 5750 Phenol= 5 METALS= EMULSION: YES NO Other TREAT or Test Info.?	PFI Reviewed YES NO Problems ? B TOTAL GALLONS= 5500	✓
DATE ~~4-4~~ 4-14	TIME 8:40	Initials GG	Trailer Number 8177	KMTEX 4017578 Profile no.: 1189	pH= 9 TOC= 21040 Phenol= 15 METALS= EMULSION: YES NO Other TREAT or Test Info.?	PFI Reviewed YES NO Problems ? B TOTAL GALLONS= 5554	✓
DATE ~~4-4~~ 4-14	TIME 8:40	Initials GG	Trailer Number 263	KMTEX 4014088 Profile no.: 1189	pH= 10 TOC= 2150 Phenol= 12 METALS= EMULSION: YES NO Other TREAT or Test Info.?	PFI Reviewed YES NO Problems ? TOTAL GALLONS= 4834	
DATE 4-8-08	TIME 10:00	Initials MP	Trailer Number ISO ANCU 638035-0	KMCO 61849 SLB OK BM Profile no.: 2696	pH= TOC= Phenol= METALS= DONE EMULSION: YES NO Other TREAT or Test Info.? Ans: Ly 1.284, 10.71#/gl	PFI Reviewed YES NO Problems ? 34,400 #'s TOTAL GALLONS= 3,212 gal	

UNLOADED

DONE

124238-2

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number TXD074198961 / 31904	2. Page 1 of 1	3. Emergency Response Phone (281) 328-3501	4. Manifest Tracking Number 004014610 JJK

5. Generator's Name and Mailing Address
KMCO, Inc.
16503 Ramsey Road
Crosby, TX 77532
Generator's Phone: (281) 328-3501

Generator's Site Address (if different than mailing address)
KMCO, Inc.
16503 Ramsey Rd.
Crosby, TX 77532
(281) 328-3501

6. Transporter 1 Company Name: CES Environmental Services, Inc. — U.S. EPA ID Number: TXD008950461

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
CES Environmental Services, Inc.
4904 Griggs Rd.
Houston TX, 77021
Facility's Phone: (713) 676-1460
U.S. EPA ID Number: TXD008950461

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. RQ, Waste corrosive, liquid, basic, inorganic (sodium hydroxide), 8, UN3266, PG II	1	TT	~~47300~~ 45,000	~~G~~ P	900519H, D002, ~~D003~~
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
Folder ID : KMCO (KMCO - Crosby, TX) — CES Job # - 62262
SIB Hazardous Wastewater
11a) 2696 11b) 11c) 11d)

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Matthew Madden — Signature: Matthew Madden — Month 4 Day 14 Year 08

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Floyd Rivers — Signature — Month 4 Day 14 Year 08
Transporter 2 Printed/Typed Name — Signature — Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Godefroy — Signature — Month 4 Day 14 Year 08

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

EPAHO113001592

Lt-638

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number TXD074198961 / 31904	2. Page 1 of 1	3. Emergency Response Phone (281) 328-3501	4. Manifest Tracking Number 004014609 JJK

5. Generator's Name and Mailing Address
KMCO, Inc.
16503 Ramsey Road
Crosby, TX 77532
Generator's Phone: (281) 328-3501

Generator's Site Address (if different than mailing address)
KMCO, Inc.
16503 Ramsey Rd.
Crosby , TX 77532
(281) 328-3501

6. Transporter 1 Company Name
CES Environmental Services, Inc.
U.S. EPA ID Number TXD008950461

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
CES Environmental Services, Inc.
4904 Griggs Rd.
Houston TX, 77021
Facility's Phone: (713) 676-1460
U.S. EPA ID Number TXD008950461

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. RQ, Waste corrosive, liquid, basic, inorganic (sodium hydroxide), 8, UN3266, PG II	1	TT		G	9005219H , D002, D003
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
Folder ID : KMCO (KMCO - Crosby, TX) CES Job # - 62261
518 Hazardous Wastewater
11a) 2696 11b) 11c) 11d)

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Matthew Madden — Signature: Matthew Madden — Month 4 Day 14 Year 08

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Floyd Rivees — Signature — Month 4 Day 14 Year 08
Transporter 2 Printed/Typed Name — Signature — Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name Signature Month Day Year

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

EPAHO113001593

124221-1

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number TXD074198961 / 31904	2. Page 1 of 1	3. Emergency Response Phone (281) 328-3501	4. Manifest Tracking Number 004014606 JJK

5. Generator's Name and Mailing Address
16503 Ramsey Road
Crosby, TX 77532
Generator's Phone: (281) 328-3501

Generator's Site Address (if different than mailing address)
16503 Ramsey Rd.
Crosby, TX 77532
(281) 328-3501

6. Transporter 1 Company Name: CES Environmental Services, Inc. — U.S. EPA ID Number: TXD008950461

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
4904 Griggs Rd.
Houston TX, 77021
Facility's Phone: (713) 676-1460
U.S. EPA ID Number: TXD008950461

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. ~~RQ, Waste corrosive, liquid, basic, inorganic (sodium hydroxide), 8, UN3266, PG II~~	1	TT		G	900521 9H, D002, D003
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
518 Hazardous Wastewater
CES Job # - 62260
11a) 2696 11b) 11c) 11d)

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Matthew Madden — Signature: Matthew Madden — Month 4 Day 14 Year 08

16. International Shipments [ ] Import to U.S. [ ] Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Floyd Rivers — Signature — Month 4 Day 14 Year 08
Transporter 2 Printed/Typed Name — Signature — Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space [ ] Quantity [ ] Type [ ] Residue [ ] Partial Rejection [ ] Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

EPAHO113001594

TRL #255

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number: TXD074198961 / 31904	2. Page 1 of 1	3. Emergency Response Phone: (281) 328-3501
4. Manifest Tracking Number	004014605 **JJK**		

GENERATOR

5. Generator's Name and Mailing Address
KMCO, Inc.
16503 Ramsey Road
Crosby, TX 77532
Generator's Phone: (281) 328-3501

Generator's Site Address (if different than mailing address)
KMCO, Inc.
16503 Ramsey Rd.
Crosby , TX 77532
(281) 328-3501

6. Transporter 1 Company Name: CES Environmental Services, Inc. — U.S. EPA ID Number: TXD008950461

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
CES Environmental Services, Inc.
4904 Griggs Rd.
Houston TX, 77021
Facility's Phone: (713) 676-1460
U.S. EPA ID Number: TXD008950461

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. RQ, Waste corrosive, liquid, basic, inorganic (sodium hydroxide), 8, UN3266, PG II	1	TT	47320	G	9005219H , D002, ~~D003~~
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
Folder ID : KMCO (KMCO - Crosby, TX) CES Job # - 62247
SIB Hazardous Wastewater
11a) 2696 11b) 11c) 11d)

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name	Signature	Month	Day	Year
X Matthew Madden	Matthew Madden	4	14	08

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

	Printed/Typed Name	Signature	Month	Day	Year
Transporter 1	Francis R Villalta	Francis R Villalta	4	14	08
Transporter 2					

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name	Signature	Month	Day	Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

EPAHO113001595

~~UNLOADED~~ LOADED 150 # ~~638033~~

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: TXD074198961 / 31904
2. Page 1 of 1
3. Emergency Response Phone: (281) 328-3501
4. Manifest Tracking Number: 004014604 JJK

5. Generator's Name and Mailing Address: KMCO, Inc.
16503 Ramsey Road
Crosby, TX 77532
Generator's Phone: (281) 328-3501

Generator's Site Address (if different than mailing address): KMCO, Inc.
16503 Ramsey Rd.
Crosby , TX 77532
(281) 328-3501

6. Transporter 1 Company Name: CES Environmental Services, Inc. — U.S. EPA ID Number: TXD008950461

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address: CES Environmental Services, Inc.
4904 Griggs Rd.
Houston TX, 77021
Facility's Phone: (713) 676-1460
U.S. EPA ID Number: TXD008950461

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. RQ, Waste corrosive, liquid, basic, inorganic (sodium hydroxide), 8, UN3266, PG II	1	TT	41,520	~~G~~ P	90052I9H , D002, ~~D003~~
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information: ERG# 154 KMCO Contact: Tom Allen — CES Job # - 62246
SIB Hazardous Wastewater
11a) 2696 11b) 11c) 11d)

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Shane Campton — Signature: Shane Campton — Month 4 Day 13 Year 08

16. International Shipments: ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Candido A. Rosales — Signature — Month 4 Day 13 Year 08
Transporter 2 Printed/Typed Name — Signature — Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Go McCoy — Signature — Month 04 Day 13 Year 08

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete. ~~DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)~~

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

180 124223-2

e print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number TXD074198961 / 31904	2. Page 1 of 1	3. Emergency Response Phone (281) 328-3501	4. Manifest Tracking Number 004014541 JJK

Generator's Name and Mailing Address
KMCO, Inc.
16503 Ramsey Road
Crosby, TX 77532
Generator's Phone: (281) 328-3501

Generator's Site Address (if different than mailing address)
KMCO, Inc.
16503 Ramsey Rd.
Crosby, TX 77532
(281) 328-3501

Transporter 1 Company Name: CES Environmental Services, Inc. — U.S. EPA ID Number: TXD008950461

Transporter 2 Company Name — U.S. EPA ID Number

Designated Facility Name and Site Address
CES Environmental Services, Inc.
4904 Griggs Rd.
Houston TX, 77021
Facility's Phone: (713) 676-1460
U.S. EPA ID Number: TXD008950461

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	RQ, Waste corrosive, liquid, basic, inorganic (sodium hydroxide), 8, UN3266, PG II	1	TT	4320	G	90052I9H, D002, D003
	2.					
	3.					
	4.					

Special Handling Instructions and Additional Information
Folder ID : KMCO (KMCO - Crosby, TX) — CES Job # - 62045
SIB Hazardous Wastewater
11a) 2696 11b) 11c) 11d)

GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Don Bryant — Signature: Don Bryant — Month Day Year: 04 11 08

International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: JUAN M FRIAS — Signature — Month Day Year: 4 11 08
Transporter 2 Printed/Typed Name — Signature — Month Day Year

Discrepancy
Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

Signature of Alternate Facility (or Generator) — Month Day Year

Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

EPAHO113001597

ISO #638035-0 DONE

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Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: TXD074198961 / 31904
2. Page 1 of 1
3. Emergency Response Phone: (281) 328-3501
4. Manifest Tracking Number: 004013923 JJK

5. Generator's Name and Mailing Address: KMCO, Inc. 16503 Ramsey Road Crosby, TX 77532
Generator's Phone: (281) 328-3501

Generator's Site Address (if different than mailing address): KMCO, Inc. 16503 Ramsey Rd. Crosby, TX 77532 (281) 328-3501

4-8-08

6. Transporter 1 Company Name: CES Environmental Services, Inc. — U.S. EPA ID Number: TXD008950461

7. Transporter 2 Company Name: — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: CES Environmental Services, Inc. 4904 Griggs Rd. Houston TX, 77021 — U.S. EPA ID Number: TXD008950461
Facility's Phone: (713) 676-1460

GENERATOR

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. RQ, Waste corrosive, liquid, basic, inorganic (sodium hydroxide), 8, UN3266, PG II	1	TT	34400	G	9005219H, D002, D003
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
Folder ID : KMCO (KMCO - Crosby, TX) 518 Hazardous Wastewater — CES Job # - 61849
11a) 2696 11b) 11c) 11d)

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Don Bryant — Signature: Don Bryant — Month 4 Day 8 Year 08

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Francis R Villalta — Signature: Francis R Villalta — Month 4 Day 8 Year 08
Transporter 2 Printed/Typed Name: — Signature: — Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number:
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Godfrey — Signature: — Month 4 Day 8 Year 08

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

EPAHO113001598

CES Environmental Services, Inc.

5/2/2008 STATUS

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
~~1~~	~~4/8/08~~	~~004013923 JJK~~	~~638035-0~~	~~61849~~	~~34,400~~		PROCESSED
~~2~~	~~4/11/08~~	~~004014541 JJK~~	~~124223-2~~	~~62045~~	~~4,320~~		PROCESSED
~~3~~	~~4/13/08~~	~~004014604 JJK~~	~~638035~~	~~62246~~	~~41,520~~		PROCESSED (4-21-08)
4	~~*4/14/08*~~	~~*004014605 JJK*~~	~~*255*~~	~~*62247*~~	~~*47,320*~~		PROCESSED (4-24-08)
~~5~~	~~*4/14/08*~~	~~*004014606 JJK*~~	~~*124221-1*~~ ***HAD A TOP OIL LAYER***	~~*62260*~~	~~*3,122 (calculated)*~~		~~PROCESSED (4-24-08)~~
~~6~~	~~04/14/08~~	~~004014609 JJK~~	~~LT-638~~	~~62261~~	~~2,544~~		~~PROCESSED~~
~~7~~	~~04/14/08~~	~~004014610 JJK~~	~~124238-2~~	~~62262~~	~~45,000~~		~~PROCESSED~~
8	~~04/15/08~~	~~004014645 JJK~~	~~124238-2~~	~~62248~~	~~2,619~~		~~PROCESSED~~
~~9~~	~~04/16/08~~	~~00401671 JJK~~	~~124223-2~~	~~62351~~	~~41,080~~		~~PROCESSED~~
10	~~04/16/08~~	~~004014672 JJK~~	~~1264~~	**~~62352~~**	~~47,260~~		~~PROCESSED~~
11	~~04/17/08~~	~~00414696 JJK~~	~~2815~~	**~~62250~~**	~~48,480~~		~~SHIPPED~~
12	04/18/08	004014841 JJK	638035	**62251**	38,320	UNDERGOING TREATMENT WORKUP	On the line

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
13	~~4/22/08~~	~~004014981 JJK~~	~~255~~	~~62704~~	~~37,020~~	~~Yes~~	SHIP Saturday
14	~~4/23/08~~	~~004014001 JJK~~	~~239~~	~~62705~~	~~48,000~~	~~Yes~~	SHIP Saturday
15	~~4/24/08~~	~~004014017 JJK~~	~~241~~	~~62706~~	~~5,303~~	~~Yes~~	SHIP Saturday
16	**4/25/08**	**004014065 JJK**	**210**	**62707**	**44,360**	Yes, Has about 2% top Oil	**NEXT TO PROCESS 5-2-2008**
17	~~4/26/08~~	~~004014108 JJK~~	~~LT-638~~	~~62708~~	~~44,780~~	~~Yes~~	SHIP Sunday
18	4/28/08	004014080 JJK	124223	62959	34,480	Yes, Has about 2% top Oil	On the line
19	4/29/08	004014156 JJK	T-876641-6	62960	35,360	Yes, Has about 2% top Oil	On the line
20	~~4/30/08~~	~~004014213 JJK~~	~~124105~~	~~62961~~	~~41,160~~	~~Yes~~	SHIP Sunday
21	5/1/08	004014267 JJK	124221	62962	41,280	Yes, Has about 2% top Oil	On the line
22							
23							
24							
25							

CES Environmental Services, Inc.

4/29/2008 STATUS

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	STATUS
~~1~~	~~4/8/08~~	~~004013923 JJK~~	~~638035-0~~	~~61849~~	~~34,400~~	PROCESSED
~~2~~	~~4/11/08~~	~~004014541 JJK~~	~~124223-2~~	~~62045~~	~~4,320~~	PROCESSED
~~3~~	~~4/13/08~~	~~004014604 JJK~~	~~638035~~	~~62246~~	~~41,520~~	PROCESSED (4-21-08)
4	~~*4/14/08*~~	~~*004014605 JJK*~~	~~*255*~~	~~*62247*~~	~~*47,320*~~	PROCESSED (4-24-08)
~~5~~	~~*4/14/08*~~	~~*004014606 JJK*~~	~~*124221-1*~~ ***HAD A TOP OIL LAYER***	~~*62260*~~	~~*3,122 (calculated)*~~	~~PROCESSED (4-24-08)~~
~~6~~	~~04/14/08~~	~~004014609 JJK~~	~~LT-638~~	~~62261~~	3812 ~~2,544~~ ~~4,548~~	~~PROCESSED~~
~~7~~	~~04/14/08~~	~~004014610 JJK~~	~~124238-2~~	~~62262~~	~~45,000~~ 4,055	~~PROCESSED~~
8	04/15/08	004014645 JJK	124238-2	62248	2,619 3,694	NEXT-Processing 4-29-08
~~9~~	~~04/16/08~~	~~00401671 JJK~~	~~124223-2~~	~~62351~~	~~41,080~~	~~PROCESSED~~
10	04/16/08	004014672 JJK	~~1264~~ D	**62352**	47,260	~~NEXT ~ 4-30;5-1~~ NOW
11	04/17/08	00414696 JJK	~~2815~~	**62250**	48,480	~~On the line~~ GONE
12	04/18/08	004014841 JJK	638035	**62251**	38,320	On the line

1 SIB STATUS Load Receipt and Processing Data Sheet, 4-29-2008

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	STATUS
13	4/22/08	004014981 JJK	SAT ~~255~~ Load + Ship	~~62704~~	37,020 708 gal	On the line 3982
14	4/23/08	004014001 JJK	SAT ~~239~~ → Slop	62705	48,000	On the line
15	4/24/08	004014017 JJK	SAT ~~241~~	62706	5,303 3,787	On the line 45,000
16	4/25/08	004014065 JJK	210 Trail	62707	36" ~~44,360~~ 3,854	~~On the line~~ Next
17	4/26/08	004014108 JJK	SUN 2 LT-638 SUN	62708	44,780	On the line
18	4/28/08	004014080 JJK	124223 OIL	62959	34,480	On the line
19	4-29	004014156 JJK	T-876641-6	62960	35,360	
20	4-30	004014213 JJK	SUN 124105 Sun 3	62961	41,160	
21	5-1-	004014 2475 JJK	124221-1	62962	41,280	
22						
23						
24						
25						
26						
27						
28						
29						
30						

Ship
241- 255
$\boxed{239}$ OK

SUN
LT 638
638 035 0.345 × 1.35
11.34 gall
124105

1 SIB STATUS Load Receipt and Processing Data Sheet, 4-29-2008

EPAHO113001602

Emmis
sions

TANK WASH

EPAHO113001603

LAB
T-32
8/4/09
CE

Gary Peterson

From: Gary Peterson
Sent: Monday, May 19, 2008 5:24 PM
To: Marlin Moser; Matt Moser; Bo Cumberland; Brian Weathers
Cc: Miles Root
Subject: Next SIB Process Trailer; 224; 5-17-2008
Attachments: SIB, 5-17-08, BATCH TRAILER 224 Treatment Processing, edited 5-17-08.doc

Attached.

The % by volume of 10% concentration of hydrogen peroxide has changed. This treatment batch will use 30% by volume of a 10% concentration of hydrogen peroxide solution.

Hydrogen peroxide treatment volumes will be based on treatability studies and will vary based on the percent contamination of mercaptan's present.

1. Less than 50,000 ppm mercaptan's : 25 % by volume of 10% concentration hydrogen peroxide solution.
2. 50,001 ppm to 59,999 ppm mercaptan's : 30 % by volume of 10% concentration hydrogen peroxide solution.
3. 60,001 ppm to 69,999 ppm mercaptan's : 35 % by volume of 10% concentration hydrogen peroxide solution.
4. 70,001 ppm to 79,999 ppm mercaptan's : 40 % by volume of 10% concentration hydrogen peroxide solution.
5. 80,001 ppm to 89,999 ppm mercaptan's : 45 % by volume of 10% concentration hydrogen peroxide solution.
6. 90,001 ppm to 99,999 ppm mercaptan's : 50 % by volume of 10% concentration hydrogen peroxide solution.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

Gary Peterson

From: Kim Harmon
Sent: Friday, August 01, 2008 10:26 AM
To: Matt Bowman; Ryan Thomas; Jennifer Rust; Prabhaker Thangudu; Karl Guidry; Gary Peterson; Miles Root
Cc: Greg Bowman; Marlin Moser; Matt Moser; Joe Camp
Subject: RE: Port Authur waste profiles for water, Port Arthur NOR, and CES Nash sample

I need a 1 liter sample to send to a potential buyer. Per their request.

From: Matt Bowman
Sent: Thursday, July 31, 2008 6:20 PM
To: Ryan Thomas; Jennifer Rust; Prabhaker Thangudu; Karl Guidry; Gary Peterson; Miles Root; Kim Harmon
Cc: Greg Bowman; Marlin Moser; Matt Moser; Joe Camp
Subject: Port Authur waste profiles for water, Port Arthur NOR, and CES Nash sample

Gary, Miles,
Please do a bench scale to produce CES Nash solution in the lab. Use 1 part SIB, 1 part enterprise MTBE, 1 part MTBE West Texas, 5 parts Citgo caustic. Start with a 22 to 25 % solution of caustic, add sulfuric to the caustic mixture (to pH of 6) to liberate the valuable sulfides and produce the nash. Next, add some peroxide to the water left to eliminate any residuals odors and quench the reaction. Kim needs about 1 liter of the produced nash and an analysis. We then need about 1 liter of the water residual from the process to go to an environmental lab for testing: Run TCLP Volatiles, TCLP Metals (plus Berillium, antimony, and nickel), RCI, TPH.

Kim, please split the 1 liter sample into about 4 separate samples to market to customers....you will also have the analysis from our lab.

Prabhakar, Karl, please register our site with the TCEQ so that we have a notice of registration. We will at least 2 initial waste codes registered for the wastewater from the process (one for class 1 and one for class 2).

Ryan, Jenny, Prabhakar,
Please set up a profile for the waste water with Newpark after we get the test results back in. We need to be ready to run the wastewater produced from the process as soon as we are running.

Thanks everyone,
Matt

Gary Peterson

From: Joe Camp
Sent: 2008-12-15 15:08
To: Gary Peterson
Subject: FW: modification to our PBR for the oil area

Joe Camp
Director of Processing
CES Environmental Services, Inc.
713-367-8601
jcamp@cesenvironmental.com

From: Matt Bowman
Sent: Monday, December 15, 2008 2:35 PM
To: Clinton Hopkins; Joe Camp
Subject: FW: modification to our PBR for the oil area

From: Matt Bowman
Sent: Friday, December 12, 2008 11:27 AM
To: 'Philip Evans'
Cc: Marlin Moser; Prabhaker Thangudu; Joy Baker
Subject: RE: modification to our PBR for the oil area

Phil, what about the possibility of simply blending this water with our other wastewater at ambient temperature? This was actually our initial inclination but hoped that for ease of processing we could go through the emulsion breaking tanks.

From: Philip Evans [mailto:pevans@wcmgroup.com]
Sent: Friday, December 12, 2008 9:50 AM
To: Matt Bowman
Cc: Marlin Moser; Prabhaker Thangudu
Subject: RE: modification to our PBR for the oil area

Matt,

We have reviewed the proposed operation involving the process stream in item 1) below. Based on the TOC levels given for the water from the new solvent separator/recovery tank and the operating temperature for tanks 1 and 4, we have determined there could be enough solvent vapor going to the thermal oxidizer that even with the 95% destruction efficiency, residual emissions will exceed PBR limits. Recall that PBR emission rate limits are low, typically 1.0 lb/hr or less depending on the compound. Most of the chemicals listed (except for butanol, propanol, and MIBK) have boiling points below 180 F and would be expected to boil out, especially methanol (BP=148 F), THF (BP=151 F), ethanol (BP=173 F) and MEK (BP=175 F). Adding a recovery step such as a condenser and accumulator vessel on the vapor vents from tanks 1 and 4 to recover the vapor before venting to the TO might help. The condenser efficiency (yield) will determine what is left going to the TO and whether it will still pass PBR limits. One concern of mine is that when the tanks are being heated to separate the solvent, you are essentially distilling it out. In the process, the solvent vapor concentration could reach lower flammability limits in the head space of the tanks. The addition of some inert gas like nitrogen may be needed. I think this is a safety item that should also be reviewed.

I will call you to discuss.

Thanks,
Phil

From: Matt Bowman [mailto:mbowman@cesenvironmental.com]
Sent: Thursday, December 11, 2008 3:22 PM
To: Philip Evans
Cc: Marlin Moser; Prabhaker Thangudu; Gary Peterson; Joy Bäker
Subject: modification to our PBR for the oil area

Phil,

1)Here are the chemicals that are in the wastewater with a 15,000 to 20,000 TOC in tanks 1 and 4 in the new oil processing area. This tank will have about 40% heavy oil mixed in with this 15-20,000 TOC:
Methanol, ethanol, propanol, butanol, IPA, MEK, MIBK, THF

2)Here are the items in the centrifuge feed tank. This tank will have about 90% heavy black oil and 10% light ends.
Toluene, xylene heptanes gasoline MEK, MIBK, THF

The new solvent separator/recovery tank we will put water/hydrocarbons into this tank (same group of chemicals for 1 and 2 above). We will vapor exchange when we load from a trailer into this tank. The water will then be pumped to tank 1 or 4 (from 1 above)

We need to try very hard to get an answer on this today because we need to give the customer an answer. We want to schedule a load that will be delivered into the solvent separator/recovery tank.

Please call if you have any questions.

Thanks,
Matt

Chemtrak
MLKU 543142-5

Rhodia

Material Safety Data Sheet

TOLCIDE PS200

Date Prepared: 9/10/07 **Supersedes Date: 2/01/07**

1. PRODUCT AND COMPANY DESCRIPTION

RHODIA INC.
RHODIA NOVECARE
CN7500
8 Cedar Brook Drive
Cranbury NJ 08512-7500

Emergency Phone Numbers:
FOR EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT CONTACT: CHEMTREC (800-424-9300 within the United States or 703-527-3887 for international collect calls) or Rhodia CAERS (Communication and Emergency Response System) at 800-916-3232.

For Product Information:
(888) 776-7337

EPA FIFRA Registration Number:
4564-15

Chemical Name or Synonym:
TETRAKIS(HYDROXYMETHYL) PHOSPHONIUM SULFATE; THPS

Molecular Formula:
$_2(C_4H_{12}O_4P) \cdot O_4S$

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Reg Number	OSHA Hazard	Percentage
TETRAKIS(HYDROXYMETHYL) PHOSPHONIUM SULFATE	55566-30-8	Y	~ 20

3. HAZARDS IDENTIFICATION

A. EMERGENCY OVERVIEW:

Physical Appearance and Odor:
colorless / liquid, characteristic odor.

Warning Statements:

DANGER! RISK OF SERIOUS DAMAGE TO EYES. HARMFUL IF INHALED. MAY BE HARMFUL IF INGESTED. MAY CAUSE ALLERGIC SKIN REACTION. POSSIBLE DEVELOPMENTAL HAZARD, MAY ADVERSELY EFFECT THE DEVELOPING FETUS (BASED ON ANIMAL DATA).

B. POTENTIAL HEALTH EFFECTS:

Acute Eye:
Expected to cause significant ~~irritation to the eyes. Can~~ cause tearing, pain, burns, permanent damage to the cornea.

Acute Skin:
May cause irritation upon prolonged contact. May cause sensitization.

Acute Inhalation:
Harmful if inhaled. May cause coughing, shortness of breath, chest pain.

Acute Ingestion:
May be harmful if swallowed. May cause nausea, vomiting.

Chronic Effects:
Repeated, prolonged ingestion may cause liver damage, (See Section 11-Chronic for a discussion of animal studies.) In a rabbit study, animals fed this product during pregnancy produced an increase in the numbers of offspring with eye abnormalities and/or minor skeletal variations, only at doses that also caused maternal (parental) toxicity. (See Section 11 for details of chronic studies).

4. FIRST AID MEASURES

FIRST AID MEASURES FOR ACCIDENTAL:

Eye Exposure:
Hold eyelids open and flush with a steady, gentle stream of water for at least 15 minutes. Seek immediate medical attention.

Skin Exposure:
In case of contact, immediately wash with plenty of soap and water for at least 15 minutes. Seek medical attention. Remove contaminated clothing and shoes while washing. Clean contaminated clothing and shoes before re-use or discard if they cannot be thoroughly cleaned.

Inhalation:
Remove victim from immediate source of exposure and assure that the victim is breathing. If breathing is difficult, administer oxygen, if available. If victim is not breathing, administer CPR (cardio-pulmonary resuscitation). Seek medical attention.

Ingestion:
Wash out mouth with water and keep at rest. Seek immediate medical attention. Do not induce vomiting unless instructed to do so by a physician.

MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE:
Skin contact may aggravate existing skin disease.

NOTES TO PHYSICIAN:
All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Treat symptomatically. No specific antidote available.

5. FIRE FIGHTING MEASURES

FIRE HAZARD DATA:

Flash Point:
Not Applicable

Extinguishing Media:
Recommended: water fog, carbon dioxide, dry chemical, foam.

Special Fire Fighting Procedures:
Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind; keep out of low areas. Evacuate residents who are downwind of fire.

Unusual Fire and Explosion Hazards:
Containers may explode (due to the build-up of pressure) when exposed to extreme heat.

Hazardous Decomposition Materials (Under Fire Conditions):
oxides of sulfur
oxides of phosphorus
oxides of carbon

6. ACCIDENTAL RELEASE MEASURES

Evacuation Procedures and Safety:
Ventilate closed spaces before entering. Personnel handling this material should be thoroughly trained to handle spills and releases. Wear appropriate protective gear for the situation. See Personal Protection information in Section 8. Evacuate and isolate spill area.

Containment of Spill:
Stop leak if it can be done without risk. Dike spill using absorbent or impervious materials such as earth, sand or clay. Dike area to prevent runoff. Collect and contain contaminated absorbent and dike material for disposal.

Cleanup and Disposal of Spill:
Recover material, if possible. DO NOT RETURN MATERIAL TO ITS ORIGINAL CONTAINER. Absorb with an inert absorbent. Shovel up into an appropriate closed container (see Section 7: Handling and Storage). Clean up residual material by washing area with water. Collect washings for disposal. The material should be properly packaged and disposed of in compliance with applicable regulations. Decontaminate tools and equipment following cleanup.

Environmental and Regulatory Reporting:
Do not flush to drain. Runoff from fire control or dilution water may cause pollution. Prevent material from entering public sewer system or any waterways. Spills may be reportable to the National Response Center (800-424-8802) and to state and/or local agencies.

7. HANDLING AND STORAGE

Minimum/Maximum Storage Temperatures:
Not Available

Handling:
Personnel handling this product should be thoroughly trained as to its hazards. Do not get on skin or in eyes. Do not breathe vapors and mists. Avoid direct or prolonged contact with skin and eyes. Use only as directed.

** HAZARD WARNING: This product belongs to a chemical family that HAS BEEN TESTED in combination with Trimethylolpropane , Trimethylolpropane derived products or their corresponding Trimethylolpropane homologs *for toxicity of the thermal decomposition products in the absence of flame. Products in this chemical family* PRODUCED NO SIGNIFICANT ADVERSE HEALTH EFFECTS in laboratory animals. However, there is a possibility that this thermal decomposition may produce bicyclic phosphates and/or phosphites in combination with certain other phosphorus compounds. Bicyclic phosphates and phosphites have acute neurotoxic properties and may cause convulsive seizures in laboratory test animals. Follow all precautionary measures outlined in this Material Safety Data Sheet and/or contact Rhodia Inc.

Storage:
Store in an area that is clean, cool, dry, well-ventilated, Store away from; bases, oxidizers, reducing agents, Store in tightly closed containers..Container material to avoid: ordinary steel, Recommended container material: high density, high molecular weight polyethylene containers. Store in original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Introductory Remarks:
These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. While developing safe handling procedures, do not overlook the need to clean equipment and piping systems for maintenance and repairs. Waste resulting from these procedures should be handled in accordance with Section 13: Disposal Considerations.

Assistance with selection, use and maintenance of worker protection equipment is generally available from equipment manufacturers.

Exposure Guidelines:
Exposure limits represent regulated or recommended worker breathing zone concentrations measured by validated sampling and analytical methods, meeting the regulatory requirements. The following limits apply to this material, where, if indicated, S=skin and C=ceiling limit:

TETRAKIS(HYDROXYMETHYL) PHOSPHONIUM SULFATE

	Notes	TWA	STEL
ACGIH		2 mg/cu m	

Engineering Controls:
Where engineering controls are indicated by use conditions or a potential for excessive exposure exists, the following traditional exposure control techniques may be used to effectively minimize employee exposures: general area dilution/exhaust ventilation.

Respiratory Protection:
When respirators are required, select NIOSH/MSHA approved equipment based on actual or potential airborne concentrations and in accordance with the appropriate regulatory standards and/or industrial recommendations.

Eye/Face Protection:
Eye and face protection requirements will vary dependent upon work environment conditions and material handling practices. Appropriate ANSI Z87 approved equipment should be selected for the particular use intended

for this material.

Eye contact should be prevented through use of chemical safety glasses with side shields or splash proof goggles. An emergency eye wash must be readily accessible to the work area. Face contact should be prevented through use of a face shield.

Skin Protection:
Skin contact should be prevented through use of suitable protective clothing, gloves and footwear, selected with regard for use conditions and exposure potential. Consideration must be given both to durability as well as permeation resistance.

Work Practice Controls:
Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material:

(1) Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.

(2) Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics, or using the toilet.

(3) Wash exposed skin promptly to remove accidental splashes or contact with this material.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical properties here represent typical properties of this product. Contact the business area using the Product Information phone number in Section 1 for its exact specifications.

Physical Appearance:
colorless / liquid.

Odor:
characteristic odor.

pH:
3 to 6 at 100 wt/wt%.

Specific Gravity:
1.09 at 20 C (68 F).

Density:
1.09 g/ml at 20 C (68 F).

Water Solubility:
miscible

Melting Point Range:
Not Available

Freezing Point Range:
~ -1 C (30 F)

Boiling Point Range:
Not Available

Vapor Pressure:
Not Available

Vapor Density:
Not Available

Viscosity:
viscosity (centistokes) : 22 cs at 24 C (75 F).

Molecular Weight:
406.3

10. STABILITY AND REACTIVITY

Chemical Stability:
This material is stable under normal handling and storage conditions described in Section 7. Under unusual conditions, such as very high temperatures and/or in the presence of strong reducing agents, the product may break down to form hazardous decomposition products noted below. The customer is advised to seek further advice from Rhodia Water Technical Service personnel when considering such applications.

Conditions To Be Avoided:
heat
Temperatures above 160C.
See HAZARD WARNING under HANDLING : in Section 7.

Materials/Chemicals To Be Avoided:
strong bases
strong acids
strong oxidizing agents
strong reducing agents

The Following Hazardous Decomposition Products Might Be Expected:

Decomposition Type: thermal
oxides of sulfur
oxides of phosphorus
oxides of carbon
phosphine gas

Hazardous Polymerization Will Not Occur.

Avoid The Following To Inhibit Hazardous Polymerization:
not applicable

11. TOXICOLOGICAL INFORMATION

Acute Eye Irritation:
Toxicological Information and Interpretation:
eye - eye irritation, rabbit. Severely irritating. This material is expected to cause significant irritation to the eyes.

Acute Skin Irritation:
Toxicological Information and Interpretation:
skin - skin irritation, rabbit. Minimally irritating. This material is not expected to cause significant irritation to the

skin.
skin - sensitization, guinea pig. Sensitizing. May cause significant allergic skin reaction.

Acute Dermal Toxicity:
The following data is for similar or related products.
Toxicological Information and Interpretation:
LD50 - lethal dose 50% of test species, > 2000 mg/kg, rat. Material tested was a 75% aqueous solution of Tetrakis (hydroxymethyl) phosphonium sulfate.

Acute Respiratory Irritation:
No test data found for product.
~~**Toxicological Information and Interpretation:**~~
lung - lung irritation (qualitative), **. This material is not expected to cause significant irritation to the respiratory tract.

Acute Inhalation Toxicity:
The following data is for similar or related products.
Toxicological Information and Interpretation:
LC50 - lethal concentration 50% of test species, 0.59 mg/l/4 hr, rat. Material tested was a 75% aqueous solution of Tetrakis (hydroxymethyl) phosphonium sulfate.

Acute Oral Toxicity:
The following data is for similar or related products.
Toxicological Information and Interpretation:
LD50 - lethal dose 50% of test species, 575 mg/kg, rat. Material tested was a 75% aqueous solution of Tetrakis (hydroxymethyl) phosphonium sulfate.

Chronic Toxicity:
This product does not contain any ~~substances that~~ are considered by OSHA, NTP, IARC or ACGIH to be ~~"probable" or "suspected" human carcinogens.~~

The following data is for similar or related products.

Toxicological Information and Interpretation - REPRODUCTIVE TOXICITY, rat. No impairment of fertility was observed in a two generation feeding study. Material tested was a 75% aqueous solution of Tetrakis (hydroxymethyl) phosphonium sulfate. - CARCINOGENICITY, **. There was no evidence of carcinogenicity in F344/N rats and B6C3F1 mice (both sexes) dosed by gavage at 5 or 10 mg THPS/kg/day for 2 years. ªref. NTP study report TR296, 1987|. - MUTAGENICITY, **. Ames Test: Negative. - MUTAGENICITY, **. Chinese hamester ovary cells (chromosomal aberrations): Positive. - TERATOGENICITY, **. A developmental toxicity study in rabbits resulted in statistically significant developmental effects in offspring, principally including eye malformations, hydrocephaly and skeletal variations, at doses that also caused maternal (parental) bodyweight gain reduction. The No Observed Effect Level (NOEL) for development toxicity and maternal toxicity (rabbit) = 18 mg/kg/day. A developmental toxicity study in rats showed a statistically significant increase only in one skeletal variation (supernumary ribs), at doses that also caused maternal toxicity. The No Observed Effect Level for development toxicity (rat) = 30 mg/kg/day; No observed effect level for maternal toxicity (rat) = 15 mg/kg/day. Material tested was a 75% aqueous solution of Tetrakis (hydroxymethyl) phosphonium sulfate. Medical surveillance for over 30 years of employees in our manufacturing facility has shown no evidence of developmental toxicity from long-term exposure nor from exposure following an acute incident, for example, a major or minor spillage. - ~~MUTAGENICITY, **. Dominant Lethal Assay~~ ªrat| (in vivo): Negative. - MUTAGENICITY, **. Mouse micronucleus (in vivo): Negative. - MUTAGENICITY, **. Unscheduled DNA synthesis assay: Negative. Material tested was a 75% aqueous solution of Tetrakis (hydroxymethyl) phosphonium sulfate. - SUB-CHRONIC EXPOSURE, 1 mg/kg/90 days, rat. Material tested was a 75% aqueous solution of Tetrakis (hydroxymethyl) phosphonium sulfate.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:
The following data is based on the technical grade active ingredient(s) (TGAI).

Ecotoxological Information and Interpretation:

LC50 - lethal concentration 50% of test species, 19.4 mg/l/48 hr, Daphnia magna.
LC50 - lethal concentration 50% of test species, 93 mg/l/96 hr, bluegill sunfish (Lepomis macrochirus).
LC50 - lethal concentration 50% of test species, 119 mg/l/96 hr, rainbow trout (Oncorhynchus mykiss).
LC50 - lethal concentration 50% of test species, 86 mg/l/96 hr, Juvenile Plaice.
LC50 - lethal concentration 50% of test species, 340 mg/l/96 hr, Brown Shrimp.
LC50 - ecotox Method for association with dry sediment weight., 2174 mg/kg/10 days, Corophium volutator. (dry sediment weight).
LD50 - lethal dose 50% of test species, 311 mg/kg, Mallard duck (Anas platyrhynchos). Material tested was a 75% aqueous solution of Tetrakis (hydroxymethyl) phosphonium sulfate.

Chemical Fate Information:
Product is not expected to bioaccumulate. The following data is for similar or related product. This product is readily biodegradable under aerobic and anaerobic conditions in a sediment-water system. 28 days (aerobic) and 30 days (anaerobic). THPS has been shown to degrade rapidly once diluted to sub-ppm concentrations and forms trishydroxymethyl phosphine oxide which is classified as non-toxic.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:
Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Please be advised that state and local requirements for waste disposal may be more restrictive or otherwise different from federal laws and regulations. Consult state and local regulations regarding the proper disposal of this material.

EPA Hazardous Waste - NO

14. TRANSPORTATION INFORMATION

Transportation Status: IMPORTANT! Statements below provide additional data on listed DOT classification.
The listed Transportation Classification does not address regulatory variations due to changes in package size, mode of shipment or other regulatory descriptors.

US Department of Transportation
Shipping Name:
NOT REGULATED

15. REGULATORY INFORMATION

Inventory Status

Inventory	**Status**
UNITED STATES (TSCA)	Y
CANADA (DSL)	Y

EUROPE (EINECS/ELINCS)	Y
AUSTRALIA (AICS)	Y
JAPAN (MITI)	Y
SOUTH KOREA (KECL)	Y

Y = All ingredients are on the inventory.
E = All ingredients are on the inventory or exempt from listing.
P = One or more ingredients fall under the polymer exemption or are on the no longer polymer list. All other ingredients are on the inventory or exempt from listing.
N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing.

FEDERAL REGULATIONS

Inventory Issues:
This product is excluded from TSCA because it is solely for FIFRA regulated use.

SARA Title III Hazard Classes:

Fire Hazard	- NO
Reactive Hazard	- NO
Release of Pressure	- NO
Acute Health Hazard	- YES
Chronic Health Hazard	- YES

STATE REGULATIONS:
This product contains the following components that are regulated under California Proposition 65:

Ingredient Name	Cancer List	Reprod. List	No Sign. Risk Lvl (ug/day) California	RPI
FORMALDEHYDE	Y	N	40	ND

16. OTHER INFORMATION

National Fire Protection Association Hazard Ratings--NFPA(R):

- **2** Health Hazard Rating--Moderate
- **0** Flammability Rating--Minimal
- **1** Instability Rating--Slight

National Paint & Coating Hazardous Materials Identification System--HMIS(R):

- **2** Health Hazard Rating--Moderate
- **0** Flammability Rating--Minimal
- **1** Reactivity Rating--Slight

Reason for Revisions:
Change and/or addition made to Section 3, Warning Statements in Section 3, Section 11, Section 14.

Key Legend Information:
ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
TLV - Threshold Limit Value
PEL - Permissable Exposure Limit
TWA - Time Weighted Average
STEL - Short Term Exposure Limit

NTP - National Toxicology Program
IARC - International Agency for Research on Cancer
ND - Not determined
RHODIA - Rhodia Established Exposure Limits

Disclaimer:
The information herein is given in good faith but no warranty, expressed or implied, is made.

** End of MSDS Document **

MSDS Number: **L6697** * * * * * *Effective Date:* ***02/13/06*** * * * * * *Supercedes:* ***11/10/05***

MSDS *Material Safety Data Sheet*

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

LITHIUM CHLORIDE

1. Product Identification

Synonyms: Lithium monochloride
CAS No.: 7447-41-8
Molecular Weight: 42.39
Chemical Formula: LiCl
Product Codes:
J.T. Baker: 2370, 2374, 4002
Mallinckrodt: 5852

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Lithium Chloride	7447-41-8	100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS CENTRAL NERVOUS SYSTEM, RESPIRATORY SYSTEM, MUSCLES AND KIDNEYS. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. SKIN IRRITATION MAY BE SEVERE.

SAF-T-DATA$^{(tm)}$ Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 0 - None
Reactivity Rating: 0 - None
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
Causes irritation to the respiratory tract. Can be absorbed through inhalation with symptoms to parallel ingestion.
Ingestion:
Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. In severe cases, lithium can cause apathy, sluggishness, drowsiness, slurred speech, blurred vision, irregular eye movements, weakness, incoordination, lethargy, heart effects, brain effects, ringing in the ears, tremors and muscle twitching, central nervous system damage, kidney effects, thyroid changes, coma, pulmonary edema, and renal failure.

Skin Contact:
Causes irritation to skin. Irritation may be severe.
Eye Contact:
Causes irritation, redness, and pain.
Chronic Exposure:
Prolonged or repeated ingestion may cause symptoms paralleling ingestion. Death may occur from large repeated oral doses.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician immediately.
Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes.

Remove contaminated clothing and shoes. Wash clothing before reuse. Call a physician.
Eye Contact:
Wash eyes with plenty of water for at least 15 minutes. Call a physician.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of*

Recommended Practices, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
White crystals.
Odor:
Odorless.
Solubility:
1 g/1.3 ml cold water
Specific Gravity:
2.07
pH:
Aqueous solution is neutral or slightly alkaline
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
1360C (2480F)
Melting Point:
613C (1135F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Emits toxic fumes of chlorine when heated to decomposition.

Hazardous Polymerization:
Will not occur.
Incompatibilities:
Bromine trifluoride.
Conditions to Avoid:
Moisture and incompatibles.

11. Toxicological Information

Toxicological Data:
Oral rat LD50: 526 mg/kg. Investigated as a tumorigen, mutagen, and reproductive effector.

Reproductive Toxicity:
Has shown some evidence of reproductive effects in laboratory animals.

--------\Cancer Lists\--

	---NTP Carcinogen---		
Ingredient	Known	Anticipated	IARC Category
Lithium Chloride (7447-41-8)	No	No	None

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
Oral (wild bird) LD50: 422 mg/kg (RTECS, 1995)

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Lithium Chloride (7447-41-8)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	--Canada-- NDSL	Phil.
Lithium Chloride (7447-41-8)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

Ingredient	-SARA 302- RQ	-SARA 302- TPQ	------SARA 313------ List	------SARA 313------ Chemical Catg.
Lithium Chloride (7447-41-8)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Lithium Chloride (7447-41-8)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **2** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS CENTRAL NERVOUS SYSTEM, RESPIRATORY SYSTEM, MUSCLES AND KIDNEYS. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. SKIN IRRITATION MAY BE SEVERE.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Keep container closed.
Avoid breathing dust.
Use only with adequate ventilation.
Wash thoroughly after handling.

Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

SIB TREATMENT

	< 50,000	25%
Mercaptan	50-60,000	30%
	60-70,000	35%
	70-80,000	40%
	80-90,000	45%
	90,000-100,000	50%

SIB Load Receipt:

Need: Job #, Trailer #, Pounds

Density, pH, Sulfide, Mercaptan, % NaOH

SIB TREATMENT

LAB T-32
6/4/09
CQ

EPAHO113001627

DATE	TRAILER #	CONTENTS	DENSITY	QUANTITY	% PRODUCT
[illegible]	[illegible]	[illegible]	[illegible]		
	234	Methanol Evalca	.82	5354	86%

1/7/09

DATE	TRAILER #	CONTENTS	DENSITY	QUANTITY	% PRODUCT
~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~		
	234	Methanol Evalca	.82	5354	86%

1/7/09

Shannon Ward

From: Shannon Ward
Sent: Thursday, January 08, 2009 4:30 PM
To: Kim Harmon
Subject: FW: City Council Open Forum

From: Shannon Ward
Sent: Thursday, January 08, 2009 1:17 PM
To: Joy Baker; Dan Bowman; Dana Carter; Gary Brauckman
Subject: City Council Open Forum

Hey guys,

I have decided that I am going to go and address the city council in person next Wednesday during their open forum. You know that I am not politically spoken, but one thing is for sure.....I like my job and I want to keep my job. I feel very strongly about letting them know how I feel about the pressure that is being applied to the company. Please join me during this forum. I know that you all could help me out on this...All of us are in the same boat. Maybe if we let them know that we are concerned, they will change their tune. It is worth it to me to try. The council would not let me sign up others, and I am going to need your help. You have to call and sign up yourself. I think this will be a stronger approach than the emails.

832-393-1100

They will ask for your address. I gave them the company address. They will also ask you what issue you plan to address.

Wednesday the 14th is the next forum at 9:30.
901 Bagby
Houston, Texas 77002
(2nd Floor)

Shannon Ward
CES Environmental
Sales Representative
Office: (713) 676-1460
Cell: (281) 785-0764
Fax: (713) 748-8664
sward@cesenvironmental.com

Visit us at http://cesenvironmental.com

EPAHO113001630

CES Environmental
Services, Inc.

4904 Griggs Road
Houston TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1460

Material / Product Approval Letter

Date **1/8/2009**

Dear **Randy Woolvine**

Thank you for choosing CES Environmental Services, Inc. for your material / product recycling needs. The following material has been approved at our facility in Houston, TX. If the material received does not conform to the profile, then rejection or additional charges may apply.

CES Profile # PA-3137

Expiration Date 1/8/2011

Producer: Citgo Refinery
Address: 4401 LA Hwy 108
Lake Charles, LA 70665

Material / Product Information

Name of Material / Product Napthenic Caustic Solution
Container Type: Barge

Detailed Description of Process Generating or Producing the Material / Product:
Processing of fuels using caustic to remove sulfides

Color: brown to red **Odor:** slight to medium **pH:** 6-12.5
Physical State:
Incompatibilities: Metals, Oxidizing Agents
Safety Related Data/Special Handling:
Chemical Suit, Rubber Gloves & boots, Safety Goggles, Face Shield, Hard Hat

If you have any questions concerning this approval and/or the conditions, then please feel free to contact our office at (713) 676-1460.

Thank you,

Matt Bowman, President
CES Environmental Services, Inc.

MBI
JR

Need Approval in system.
P# 3137-PA

CES Environmental Services, Inc.

4904 Griggs Road Houston, TX 77021
Phone: (713) 676-1460 Fax: (713) 676-1676
http://www.cesenvironmental.com
TCEQ Industrial Solid Waste Permit No: 30948
U.S. EPA ID No: TXD008950461 ISWR No: 30900

SECTION 1: Material Producer Information

Company : Citgo Refinery
Address : 4401 LA Hwy 108 4401 LA Hwy 108
City, State, Zip : Lake Charles LA 70665
Contact : Mike Robison **Title :**
Phone No : (337) 708-6344 **Fax :**
24 / HR Phone :
U.S EPA I.D No :
State I.D : **SIC Code**

SECTION 2: Billing Information

Company : Citgo Accounts Payable
Address : P. O. Box 4970
City, State, Zip : Houston TX 77210
Contact : Randy Woolvine **Title :**
Phone No : (337) 708-8274 **Fax :** (337) 708-6289

SECTION 3: General Description of the Material / Product

Name of Mateiral / Product : Napthenic Caustic Solution

Detailed Description of the Process Generating or Producing the Material / Product:
Processing of fuels using caustic to remove sulfides

Physical State : ☑ Liquid ☐ Sludge ☐ Powder ☐ Solid ☐ Filter Cake ☐ Combination

Color : brown to red **Odor :** slight to medium

Specific Gravity (Water=1) : .95-1.1 **Density :** 8.5-9 lbs / gal

Does this material contain any total phenolic compounds? ☑ Yes ☐ No
Does this material contain any para substituted phenolic compounds? ☐ Yes ☐ No

Layers : ☑ Single-Phas ☐ Multi-Phase

Container Type : ☐ Drum ☐ Tote ☐ Truck ☑ Other (explain) Barge

Container Size : 340K gallons
Number Of Units : 2

Proper U.S. DOT Shipping Name : Sodium Hydroxide Solution

Class : 8 **UN/NA :** UN1760 **PG :** II **RQ :**

EPAHO113001632

Flash Point	pH	Reactive Sulfides	Reactive Cyanides	Solids
N/A	6-12.5	N/A mg/l	N/A mg/l	0 %
Oil and Grease	**TOC**	**Zinc**	**Copper**	**Nickel**
N/A mg/l	N/A mg/l	N/A mg/l	N/A mg/l	N/A mg/l

SECTION 4: Physical and Chemical Data

COMPONENTS TABLE The material / product consists of the following materials	Concentration Ranges are acceptable	Units or %
Sodium Hydroxide	0-1	%
Napthenic Acid	2-6	%
Phenols	<10K	mg / l
Water	93-98	%

SECTION 5: Safety Related Data

If the handling of this material / product requires the use of special protective equipment, please explain.
Chemical Suit, Rubber Gloves & boots, Safety Goggles, Face Shield, Hard Hat

SECTION 6: Attached Supporting Documents

List all documents, notes, data, and/or analysis attached to this form as part of the material / product profile.
MSDS

SECTION 7: Incompatibilities

Please list all incompatibilities (if any):
Metals, Oxidizing Agents

SECTION 8: Material Producer's Certification

The information contained herein is based on ☑ generator knowledge and/or ☐ analytical data. I hereby cerity that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no deliberate or willful omissions of composition properties exist and that all known or suspected hazards have been disclosed. I certify that the materials tested are representative of all materials described by this document.

Authorized Signature : ______________________ **Date :** __________

Printed Name / Title : /

CES USE ONLY (DO NOT WRITE IN THIS SPACE) **Process Facility Information :**

Compliance Officer : Robbie Lloyd

Date : 1-7-09 **Status :** Approved Rejected

Approval Number : PA-3137

EPAHO113001633

Gary Peterson

From: Joe Camp
Sent: 2009-01-09 09:35
To: Matt Bowman; Gary Peterson
Cc: Clinton Hopkins
Subject: RE: NaSH Treatment of Hydril Water

There are other issues which Miles did not go into depth about, but I'm pretty sure that you're already aware.

1. This method would create quite an odor
2. We have a limit on how much sulfides we can discharge to the city (5ppm?)
3. This would be very labor intensive if we have to send it through the filter press twice (tying up tank space and lots of time)

What else am I missing Gary? Are the things I mentioned above correct?

I'm not saying that this is not an option, but I would rather try equalization in the frac tanks. That method is not convenient either, but at least it doesn't tie up tank space inside and the filter presses. And even more importantly, it doesn't create an odor issue which I don't think we can afford right now..

We began using the frac tanks for equalization this past week, and I think that it's working okay so far. It's taking time to get everyone (lab personnel and waste water workers) used to it because it's a new concept to them. But once they get up to speed on the process it should go okay. When we could run into problems is when we have large amounts of high metals water in the oil plant (40,000 gallons) and very little good water coming in to equalize it with.

Tomorrow (Saturday) we will clean out the frac tanks to remove whatever oil, sludge, etc. that we can to make using these frac tanks easier and more effective.

Thanks.

- NASH liquid handling, processing to the treatment tank.
- Sludge / Press Processing odor

Joe Camp
Director of Processing
CES Environmental Services, Inc.
713-367-8601
jcamp@cesenvironmental.com

From: Matt Bowman
Sent: Thursday, January 08, 2009 4:51 PM
To: Miles Root; Gary Peterson; Joe Camp; Clinton Hopkins; Sam Brown
Cc: Greg Bowman; Dana Carter; Dan Bowman; Shannon Ward; Joy Baker; Gary Brauckman; Ryan Thomas; Steve Stricker; Scott Shimer
Subject: RE: NaSH Treatment of Hydril Water

Awesome work Guys!!!!!!!!!!!!!!! It looks like there might be a little extra work on these loads but I knew you guys would find a path to success!!!!!!!!!!!!
This methodology has the potential to completely eliminate our zinc problems and stop the madness of sending so much offsite to Newpark

From: [redacted]
Sent: Thursday, January 08, 2009 4:12 PM
To: [redacted]
Subject: NaSH Treatment of Hydril Water

A sample of the high zinc Hydril water that we were unable to treat with standard treatment was successfully treated with our NaSH product.
This was just a quick test to see if this would be viable, so it can be refined over time. A 0.4 vol% of the NaSH product was added to a sample of the Hydril water that had been previously treated with our standard water treat. This sample was spun out in a centrifuge to remove solids. The NaSH was added along with a couple of drops of ferric chloride to help remove any additional sulfides. This sample was well mixed and then spun out in a centrifuge to remove the sulfidic sludge solids. This water tested for zinc showed approximately 0.1 ppm. After our standard treat it was at 9 ppm. This is quite effective.
Instead of centrifuging the material it will need to go through our filter press. There will be two runs, the first to remove the initial water treat solids, the second to remove the sulfidic sludge. The remaining water does have a fairly hefty odor of sulfidic caustic and this is still an issue. My previous work showed that addition of peroxide at this point to remove sulfides also destroyed its treatment ability.

There may be some good possibilities here with proper handling in the plant. Odors are still an issue and will need to be dealt with.

[redacted]
Laboratory Research and Development Specialist
CES Environmental Services, Inc.
4904 Griggs Road
Houston, TX 77021
Cell: 832-607-6678
Fax: 713-748-8664

PJ# 15817

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
TXD000356907	1	(800) 424-9300	004251656 JJK

5. Generator's Name and Mailing Address
PPG Industries, Inc
State ID: 30553
1901 Ave H @ 16th St.
LaPorte, TX 77572
Generator's Phone: (800) 424-9300

Generator's Site Address (if different than mailing address)
PPG Industries, Inc
1901 Avenue H & South 16th Street
LaPorte, TX 77572
(800) 424-9300

6. Transporter 1 Company Name: CES Environmental Services, Inc. State ID 30900 — U.S. EPA ID Number: TXD008950461

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
CES Environmental Services. Inc.
4904 Griggs Rd.
Houston TX, 77021
State ID 30900
Facility's Phone: (713) 676-1460
U.S. EPA ID Number: TXD008950461

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. RQ, Waste dichloromethane (F002, F003, D001, Methanol), 6.1, UN1593, PG III (FOR RECYCLE) [ERG 160]	1	TT	32,080	P	0115202H, F002, F003, D001
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
Folder ID : PPG (PPG LaPorte, TX)
Methylene Chloride
1) HOU-2281 2) 3) 4)

This is to certify that the above-named materials are properly classified, described, packaged marked & labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation CES Job # - 79279

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: ~~Ronald Drozl~~ Jeff Grimes — Signature — Month 01 Day 12 Year 09

16. International Shipments: ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: WILFRIDO ABREU — Signature — Month 01 Day 12 Year 09
Transporter 2 Printed/Typed Name — Signature — Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H020			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: MARISSA WOOLSEY — Signature — Month 1 Day 13 Year 09

GENERATOR · INT'L · TRANSPORTER · DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.
DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

ease print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of 1	3. Emergency Response Phone (713) 450-8883	4. Manifest Tracking Number 004249240 JJK

5. Generator's Name and Mailing Address
Greens Bayou Pipe Mill, LP
13935 Industrial Road
Houston, TX 77015
State ID:
Generator's Phone: (713) 450-8883

Generator's Site Address (if different than mailing address)
Greens Bayou Pipe Mill, LP
13935 Industrial Road
Houston, TX 77015
(713) 450-8883

6. Transporter 1 Company Name: CES Environmental Services, Inc. State ID 30900 U.S. EPA ID Number TXD008950461

7. Transporter 2 Company Name U.S. EPA ID Number

8. Designated Facility Name and Site Address
CES Environmental Services, Inc.
4904 Griggs Rd.
Houston TX, 77021
State ID
U.S. EPA ID Number TXD008950461
Facility's Phone: (713) 676-1460

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. Non-RCRA/Non-DOT Regulated Material (oil contaminated rags and PPE)	~~1~~ 6	BA	~~55~~ 6	~~G~~ 4,300	00044891
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
Point ID: Greens Bayou Pipe Mill (Houston) CES Profile # CES Job # - 77606
PPE Disposal
1) HOU-2655 2) 3) 4)

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: X Johnny A Perez Signature Month 12 Day 10 Year 08

16. International Shipments ☑ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: A Garza Signature Month 12 Day 10 Year 08
Transporter 2 Printed/Typed Name Signature Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1. ~~H132~~ H141 SB	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: SAM BROWN Signature Month 12 Day 10 Year 08

Form 8700-22 (Rev. 3-05) Previous editions are obsolete. **DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)**

EPAHO113001637

(217)

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Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	1	(281) 470-5555	004249118 JJK

5. Generator's Name and Mailing Address
Port of Houston Authority - Tellepsen Fireboat State ID
1819 East Barbours Cut
Morgans Point, TX 77571
Generator's Phone: (281) 470-5555

Generator's Site Address (if different than mailing address)
Port of Houston Authority - Tellepsen Fireboat
1819 East Barbours Cut
Morgans Point, TX 77571
(281) 470-5555

6. Transporter 1 Company Name: CES Environmental Services, Inc. State ID 30900 — U.S. EPA ID Number: TXD008950461

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
CES Environmental Services, Inc. State ID 30900
4904 Griggs Rd.
Houston TX, 77021
Facility's Phone: (713) 676-1460
U.S. EPA ID Number: TXD008950461

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. Non-RCRA/Non-DOT Regulated Material (absorbent)	5	DM	4,800	P	CESQ4891
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
Folder ID : Port of Houston (POH @ Tellepsen Fire Boat) CES Job # - 77329
Production Waste
1) HOU-2716 2) - 3) - 4) -

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Roger Ramon — Signature: [signature] — Month 12 Day 08 Year 08

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: A - Garza — Signature: [signature] — Month 12 Day 8 Year 08
Transporter 2 Printed/Typed Name — Signature — Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. ~~H132~~ H141 SB 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: SAM BROWN — Signature: [signature] — Month 12 Day 08 Year 08

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

EPAHO113001638

217

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: TXR000068429
2. Page 1 of 1
3. Emergency Response Phone: (281) 214-8800
4. Manifest Tracking Number: 004249119 JJK

5. Generator's Name and Mailing Address
Sigma Fasteners State ID: 67853
16723 Aldine Westfield
Houston, TX 77032
Generator's Phone: (281) 214-8800

Generator's Site Address (if different than mailing address)
Sigma Fasteners
16723 Aldine Westfield
Houston, TX 77032
(281) 214-8800

6. Transporter 1 Company Name: CES Environmental Services, Inc. State ID 30900
U.S. EPA ID Number: TXD008950461

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
CES Environmental Services, Inc. State ID 30900
4904 Griggs Rd
Houston TX, 77021
Facility's Phone: (713) 676-1460
U.S. EPA ID Number: TXD008950461

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. Non-RCRA/Non DOT regulated waste solids	8	DM	7,500	P	00055051
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
Folder ID: Sigma Fasteners (Houston) CES Job # - 77419
Misc Wastes

1) HOU-1466 2) 3) 4)

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Misael Molina Signature: [signature] Month 12 Day 8 Year 08

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: A-Garza Signature: [signature] Month 12 Day 8 Year 08
Transporter 2 Printed/Typed Name Signature Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. ~~H132~~ H141 SB 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Sam Brown Signature: [signature] Month 12 Day 8 Year 08

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

EPAHO113001639

Laboratory Analysis Report

Total Number of Pages: 8

Job ID : 08120069

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
1208-5,6 NOV Testing SP5

Report To :	Client Name:	CES Environmental	P.O.#:	1208-5,6
	Attn:	Gary Peterson	Sample Collected By:	Bob Stone
	Client Address:	4904 Griggs Rd	Date Collected:	12/03/08
	City, State, Zip:	Houston, Texas, 77021		

A&B Labs has analyzed the following samples...

Client Sample ID	Matrix	A&B Sample ID
Sample Point #5 Lab Log ID:1208-5	Waste Water	08120069.01
Sample Point #5 Lab Log ID:1208-6	Waste Water	08120069.02

RECEIVED
DEC 15 2008

Shantall Carpenter

Released By: Shantall Carpenter
Title: Project Manager
Date: 12/10/2008

This Laboratory is NELAP (T104704213-08-TX) accredited. Effective: 07/01/2008; Expires: 06/03/2009
Scope: Non-Potable Water, Drinking Water, Air, Solid, Hazardous Waste

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted in the attached exception reports. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been identified in the Laboratory Review Checklist, and that no information or data have been knowingly withheld that would affect the quality of the data.

Revised report to correct project name.

Date Received : 12/03/2008 12:22

LABORATORY TERM AND QUALIFIER DEFINITION REPORT

Job ID : 08120069

Date: 12/10/2008

General Term Definition

Back-Wt	Back Weight	Post-Wt	Post Weight
BRL	Below Reporting Limit	ppm	parts per million
cfu	colony-forming units	Pre-Wt	Previous Weight
Conc.	Concentration	Q	Qualifier
D.F.	Dilution Factor	RegLimit	Regulatory Limit
Front-Wt	Front Weight	RPD	Relative Percent Difference
LCS	Laboratory Check Standard	RptLimit	Reporting Limit
LCSD	Laboratory Check Standard Duplicate	surr	Surrogate
MS	Matrix Spike	T	Time
MSD	Matrix Spike Duplicate	TNTC	Too numerous to count
MW	Molecular Weight		

Qualifier Definition

Revised report to correct project name.

LABORATORY TEST RESULTS

Job ID : 08120069

Date 12/10/2008

Client Name:	CES Environmental	Attn: Gary Peterson
Project Name:	1208-5,6 NOV Testing SP5	

Client Sample ID:	Sample Point #5 Lab Log ID:1208-5	Job Sample ID:	08120069.01
Date Collected:	12/03/08	Sample Matrix	Waste Water
Time Collected:	11:26		
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	Rpt Limit	Reg Limit	Q	Date Time	Analyst
EPA 1664A	Oil & Grease, Hexane Extractables								
	Oil & Grease	103	mg/L	1.11	2.78			12/09/08 09:20	SG

Revised report to correct project name.

LABORATORY TEST RESULTS

Job ID : 08120069

Date 12/10/2008

Client Name:	CES Environmental	Attn: Gary Peterson
Project Name:	1208-5,6 NOV Testing SP5	

Client Sample ID:	Sample Point #5 Lab Log ID:1208-6	Job Sample ID:	08120069.02
Date Collected:	12/03/08	Sample Matrix	Waste Water
Time Collected:	11:27		
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	Rpt Limit	Reg Limit	Q	Date Time	Analyst
EPA 1664A	Oil & Grease, Hexane Extractables								
	Oil & Grease	115	mg/L	1.12	2.80			12/09/08 09:20	SG

Revised report to correct project name.

QUALITY CONTROL CERTIFICATE

Job ID : 08120069 **Date :** 12/10/2008

Analysis : Oil & Grease, Hexane Extractables **Method : EPA 1664A** **Reporting Units : mg/L**

QC Batch ID : Qb08120903 **Created Date :** 12/09/08 **Created By :** Sgarcia

Samples in This QC Batch : 08120069.01,02

Sample Preparation : PB08120903 **Prep Method :** EPA 1664A **Prep Date :** 12/09/08 09:10 **Prep By :** Sgarcia

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	RptLimit		Qual
Oil & Grease		BRL	mg/L	1	2.5		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Oil & Grease	39.5	36.9	93.4	39.5	35.7	90.4	3.31	11	78-114	

QC Type: MS and MSD
QC Sample ID: 08120077.02

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Oil & Grease	BRL	43.9	39.6	89.3						78-114	

Revised report to correct project name. Refer to the Definition page for terms.

10100 East Freeway (I-10)
Houston, TX 77029
713-453-6060
1-877-478-6060 Toll Free
713-453-6091 Fax
info@ablabs.com
www.ablabs.com

1. REPORT TO:	2. INVOICE TO:	3. PO #
Company: CES Envirnmental Services, Inc.	Company: Same	
Address: 4904 Griggs Rd. Houston, Texas 77021	Address:	
Contact: Gary R. Peterson	Contact:	
Phone: 713-676-1460	Cell: 832-367-1383	
Fax: 713-676-1676	Fax:	
Email: gpeterson@cesenvironmental.com	Email:	
Email CC:	Email CC:	

4. Turnaround Time (Business Days)
☐ 1 Day * ☐ Other
☐ 2 Days *
☐ 3 Days *
☑ 5 Days * * Surcharge
☐ 7 Days-Standard

A&B JOB ID 08120109

5. Project #

6. Project Name / Location
NOV Testing, Tankwash / Permit Number 6806 / 4904 Griggs Rd., Houston

7. Reporting Requirement
☐ TRRP Limits Only ☐ TRRP Rpt. Package ☐ See Attached ☐ Standard Level II

8. Sampler's Name & Company: Bob Stone / A&B Labs
Sampler's Signature & Date

14. Containers*
15. Preservatives**
16. pH-Lab Only
Sampling Charge: 2
Equipment Rental Fee:

	9. Sample ID & Description	Lab Use Only	10. Sampling Date	Time	11. Comp	Grab	12. Matrix Water	WW	Soil	Sludge	Oil	Air	13. No. of Containers		Oil & Grease					18. Comments
1-A	Sample Point #5		12/3/2008	11:26		X		X							X					
	Lab Log ID: 1208-5																			
2-A	Sample Point #5		12/3/2008	11:27		X		X							X					
	Lab Log ID: 1208-6																			

* On Site

19. RELINQUISHED BY	DATE	TIME	20. RECEIVED BY	DATE	TIME	KNOWN HAZARDS / COMMENTS:
1) Bobby [signature]	12/3/08	12:22				
2)						
3)			21. RECEIVED BY LABORATORY Dorothy Wright	12/3/08	12:22	20.1

* Containers: VOA- 40 ml vial; 4 oz/8 oz- glass wide mouth; A/G- Amber/Glass 1 Liter; P/O- Plastic/other

**Preservatives: C-Cool H- HCl N- HNO3 S-H2SO4 OH- NaOH T-Na2S2O3 X- Other

Temperature: 20.1
Intact? ☒ Y ☐ N
Initials DW

BILL OF LADING/TRACKING #

METHOD OF SHIPMENT

A&B CANNOT ACCEPT VERBAL CHANGES. PLEASE FAX WRITTEN CHANGES TO 713-453-6091 OR EMAIL THE NEW COC TO YOUR PROJECT MANAGER.

Samples will be disposed of after 30 days. A&B reserves the right to return samples.

CES Environmental Services SPECIAL PROJECTS

Chain of Custody Record

CES Environmental Services
4904 Griggs Rd. **Main Number: (713) 676-1460**
Houston, TX 77021 **Fax: (713)676-1676**

PRIVATE ANALYTICAL SAMPLING LABORATORY
A&B Labortories, 10100 East Freeway, Houston, TX 77029 Phone (713) 453-6060, Fax (713) 453-6091

08120069

Project Name	Sample Name	Comments/Special Instructions:
NOV Testing SP5	See Below	Turnaround Time Required: 5 days
Project Supervisor: Gary Peterson		Date Needed: 12-10-08 Number of Days: 5
SAMPLE COLLECTED BY: PRINT: Bob Stoyne SIGN: Bobby [signature]		**OTHER INFORMATION:** **Permit Number: 6806**
Date & Time Sample Collected: 12/3/08 1126 1127		Sample Matrix: LIQUID
Composite Date and Time: **N/A** GRAB		Sample Point Number: SP No. 5
Begin Date: Begin Time: AM PM		Container: Glass, Wide Mouth with a PTFE-lined screw cap.
End Date: End Time: AM PM		Preservation Type: Sulfuric Acid to a pH less than 2.0
Type & No. of Samples & Containers (circle):		Sample volume: ~ 1,000 milliliters
Glass 2 PRESERVATION		SAMPLE ID: Sample point 5
Grab YES		LAB LOG ID: 1208-5 1124 01-A
		LAB LOG ID: 1208-6 1127 02-A

Requested Analytical Testing:

Oil & Grease, EPA 1664

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[signature]	12/3/08	1222	Dorothy Wright	12/3/08	12:22
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Page 7 of 8

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EPAHO113001646

Sample Condition Checklist

Date : 12/10/08

A&B JobID : **08120069**	Date Received : **12/03/2008**	Time Received : **12:22PM**	
Client Name : **CES Environmental**			
Temperature : **20.1°C**	Sample pH : **<2(O&G)**		

	Check Points	Yes	No
1.	**Cooler seal present and signed.**	N/A	
2.	**Sample(s) in a cooler.**	X	
3.	**If yes, ice in cooler.**	X	
4.	**Sample(s) received with chain-of-custody.**	X	
5.	**C-O-C signed and dated.**	X	
6.	**Sample(s) received with signed sample custody seal.**	N/A	
7.	**Sample containers arrived intact. (If no comment).**	X	
8.	**Matrix :** Water ☑ Soil ☐ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☐ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐		
9.	**Sample(s) were received in appropriate container(s).**	X	
10.	**Sample(s) were received with proper preservative**		
11.	**All samples were logged or labeled.**	X	
12.	**Sample ID labels match C-O-C ID's**	X	
13.	**Bottle count on C-O-C matches bottles found.**	X	
14.	**Sample volume is sufficient for analyses requested.**	X	
15.	**Samples were received within the hold time.**	X	
16.	**VOA vials completely filled.**	N/A	
17.	**Sample accepted.**	X	

Comments : Include actions taken to resolve discrepancies/problem:

Sample cooling intiated in the field

Received by : Dwright	Check in by/date : Dwright / 12/03/2008

ENVIRON Express Laboratories

ENVIRON EXPRESS LABORATORIES, INC.

401 N. 11th. St.
La Porte, TX 77571
281.471.0951 FAX:281.471.5821

CERTIFICATE OF ANALYSIS NO: 63260.01

Customer: **CES Env. Svcs.**
Project ID: **Lead Precipitation**
Project Loc: **4904 Griggs Rd., Hou., TX**
Charge/P.O.: **0508-26**

Sample ID: **Austin Energy Lead Treatment Sludge**
Matrix: **Sludge**
Type: **Grab**

Environ ID: **63260.01**
Sampled:
Received: **05-14-08**
Reported: **06-04-08**

ANALYTE/ PARAMETER	RESULT	UNITS	REG. LIMIT	MQL	EPA TEST METHOD	TEST BY	DATE	TIME
METAL -TCLP					SW846.1311	MN	05-04-08	
Lead	< 0.02	mg/l	1.5/5.0	0.02	SW846.6010B	JA	05-16-08	13:03

Key:
REG - Regulatory Limit (User Should Verify)
MQL - Method Quantitation Limit
TCLP - Toxicity Characteristic Leaching Procedure
mg/l - PPM by Vol SU - Standard Units
mg/kg - PPM by Wt mg - milligrams
kg - kilograms
l - Liter

John Keller

John Keller, Ph.D
Laboratory Director

06/04/2008 10:40 2814764406 MES PAGE 02/04

ENVIRON EXPRESS QUALITY CONTROL REPORT

ANALYSIS:	METALS	METHOD:	EPA SW846/6010	MATRIX:	LIQUID

ANALYST:	JA	DATE:	05.16.08	UNITS:	PPM (mg/l)	NO.SAMPLES:	1

SAMPLES:	63230.01						

MATRIX SPIKE & MATRIX SPIKE DUPLICATE ANALYSIS	BATCH ID:	63260.01

SAMPLE Matrix	SAMPLE RESULTS	SPIKE ADDED	SPIKE RESULTS	RECOV. %	RECOV. DUP. %	REL. DIFF. %	CONT. CALIB.	METHOD BLANK	QC LIMITS	
									RECOV.	DIFF.
Arsenic	0.00	5	4.50	90	91	1	94	0	75 - 125	20
Barium	0.00	5	4.50	90	91	1	96	0	75 - 125	20
Cadmium	0.00	5	4.63	93	94	1	100	0	75 - 125	20
Chromium	0.00	5	4.60	92	90	2	99	0	75 - 125	20
Lead	0.00	5	4.45	89	90	1	100	0	75 - 125	20
Selenium	0.00	5	4.57	91	92	0	98	0	75 - 125	20
Silver	0.00	5	4.40	88	88	0	95	0	75 - 125	20

JOHN KELLER, Ph.D
Laboratory Director

CES Environmental Services, Inc.

TESTING LABORATORY IDENTIFICATION & INFORMATION:
Environ

CHAIN of CUSTODY RECORD

CES Environmental Services, Inc.	Test Results Reporting
4904 Griggs Road	CES Environmental Services, Inc.
Houston, TX 77021	Main Number: (713) 676-1460
Main Number: (713) 676-1460	Fax Number: (713) 676-1676
Fax Number: (713) 676-1676	G.R. Peterson phone #: 832 367 1383

Project Name	Sample Name	Comments/Special Instructions:
Lead Precipitation	Austin Energy Lead Treatment Sludge	**Turnaround Time Required:**
Contact: Gary R Peterson		DATE and/or Number of Days: RUSH
SAMPLER: PRINT: Gary R Peterson SIGN: Gary Peterson		OTHER INFORMATION:
Type and Number of Containers (CIRCLE): Glass 1 2 3 4oz Grab 4 5 6 Other:		SAMPLE NAME/ID ('s): Austin Energy Lead Treatment Sludge CES Sample LOG BK Number ('s): 0508-26
Requested Analysis: TCLP lead only		63260.01 ☐ ☐

1. Relinquished By:	Date:	Time:	2. Received By:	Date:	Time:
[signature]	5/14	10:10 A.M.	[signature]	5/14/08	10:12
3. Relinquished By:	**Date:**	**Time:**	**4. Received By:**	**Date:**	**Time:**
5. Relinquished By:	**Date:**	**Time:**	**6. Received By:**	**Date:**	**Time:**

1° 4 oz glass ... filter

ENVIRON EXPRESS LABORATORIES, INC.

401 N. 11th. St.
La Porte, TX 77571
281.471.0951 FAX:281.471.5821

ENVIRON Express Laboratories

CERTIFICATE OF ANALYSIS NO: 63260.01

Customer: **CES Env. Svcs.**
Project ID: **Lead Precipitation**
Project Loc: **4904 Griggs Rd., Hou., TX**
Charge/P.O.: **0508-26**

Sample ID: **Austin Energy Lead Treatment Sludge**
Matrix: **Sludge**
Type: **Grab**

Environ ID: **63260.01**
Sampled:
Received: **05-14-08**
Reported: **06-04-08**

ANALYTE/ PARAMETER	RESULT	UNITS	REG. LIMIT	MQL	EPA TEST METHOD	TEST BY	DATE	TIME
METAL -TCLP					SW846.1311	MN	05-04-08	
Lead	< 0.02	mg/l	1.5/5.0	0.02	SW846.6010B	JA	05-16-08	13:03

Key:
REG - Regulatory Limit (User Should Verify)
MQL - Method Quantitation Limit
TCLP - Toxicity Characteristic Leaching Procedure
mg/l - PPM by Vol SU - Standard Units
mg/kg - PPM by Wt mg - milligrams
kg - kilograms
l - liter

John Keller

John Keller, Ph.D
Laboratory Director

ENVIRON EXPRESS QUALITY CONTROL REPORT

ANALYSIS:	METALS	METHOD:	EPA SW846/6010	MATRIX:	LIQUID

ANALYST:	JA	DATE:	05.16.08	UNITS:	PPM (mg/l)	NO.SAMPLES:	1

SAMPLES:	63230.01						

MATRIX SPIKE & MATRIX SPIKE DUPLICATE ANALYSIS	BATCH ID:	63260.01

SAMPLE Matrix	SAMPLE RESULTS	SPIKE ADDED	SPIKE RESULTS	RECOV. %	RECOV. DUP. %	REL. DIFF. %	CONT. CALIB.	METHOD BLANK	QC LIMITS RECOV.	DIFF.
Arsenic	0.00	5	4.50	90	91	1	94	0	75 - 125	20
Barium	0.00	5	4.50	90	91	1	96	0	75 - 125	20
Cadmium	0.00	5	4.63	93	94	1	100	0	75 - 125	20
Chromium	0.00	5	4.60	92	90	2	99	0	75 - 125	20
Lead	0.00	5	4.45	89	90	1	100	0	75 - 125	20
Selenium	0.00	5	4.57	91	92	0	98	0	75 - 125	20
Silver	0.00	5	4.40	88	88	0	95	0	75 - 125	20

JOHN KELLER, Ph.D
Laboratory Director

[redacted]

CES Environmental Services, Inc.

TESTING LABORATORY IDENTIFICATION & INFORMATION:
Environ

CHAIN of CUSTODY RECORD

CES Environmental Services, Inc.
4904 Griggs Road
Houston, TX 77021
Main Number: (713) 676-1460
Fax Number: (713) 676-1676

Test Results Reporting
CES Environmental Services, Inc.
Main Number: (713) 676-1460
Fax Number: (713) 676-1676
G.R. Peterson phone #: 832 367 1383

Project Name	Sample Name	Comments/Special Instructions:
Lead Precipitation	Austin Energy Lead Treatment Sludge	**Turnaround Time Required:** DATE and/or Number of Days: RUSH
Contact: Gary R Peterson		
SAMPLER: PRINT: Gary R Peterson SIGN: Gary R Peterson		OTHER INFORMATION:
Type and Number of Containers (CIRCLE): Glass 1 2 3 4oz; Grab 4 5 6 Other:		SAMPLE NAME/ID ('s): Austin Energy Lead Treatment Sludge; CES Sample LOG BK Number ('s): 0508-26

Requested Analysis : TCLP lead only 63260.01 ☐ ☐

1. Relinquished By:	Date:	Time:	2. Received By:	Date:	Time:
[signature]	5/14	10:10 A.M.	[signature]	5/14/08	10:12
3. Relinquished By:	Date:	Time:	4. Received By:	Date:	Time:
5. Relinquished By:	Date:	Time:	6. Received By:	Date:	Time:

4 oz glass ... filter

ENVIRON EXPRESS LABS
401 N. 11TH STREET
LA PORTE, TEXAS 77571
281-471-0951 (WORK)
281-471-5821 (FAX)

FACSIMILE COVER

COMPANY: CES ENVIRONMENTAL

PLEASE DIRECT FOLLOWING PAGE(S) TO: Gary Peterson

PAGES INCLUDING COVER LETTER: 4

FAX: 713-676-1676 (alternate: 713.748.8664)

ENVIRON EXPRESS LABS
401 N. 11TH STREET
LA PORTE, TEXAS 77571
281-471-0951 (WORK)
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COMPANY: CES ENVIRONMENTAL

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FAX: 713-676-1676 (alternate: 713.748.8664)

Please approve
changes.
Jenny

CES Environmental
Services, Inc.

4904 Griggs Road
Houston TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1460

Waste Pre-Acceptance/Approval Letter

Date **12/5/2008**

Dear **Dave Roe**

Thank you for choosing CES Environmental Services, Inc. for you waste disposal and/or recycling needs. The following waste stream has been approved at our facility in Houston, TX. If the waste received does not conform to the profile, then rejection or additional charges may apply.

CES Profile # HOU-3107

Expiration Date 12/5/2010

Generator: PPG Industries, Inc
Address: 1901 Avenue H & South 16th Street
LaPorte, TX 77572

Waste Information

Name of Waste: TCCHPF-PC Production waste
TCEQ Waste Code #: 0115202H
Container Type:
Detailed Description of Process Generating Waste:

Color: varies **Odor:** hydrocarbon **pH:** na
Physical State:
Incompatibilities: oxidizers
Safety Related Data/Special Handling:
see msds

If you have any questions concerning this approval and/or the conditions, then please feel free to contact our office at (713) 676-1460.

Thank you,

Matt Bowman, President
CES Environmental Services, Inc.

JK
RK

CES Environmental Services, Inc.

☑ CES Environmental Services - Houston Facility 4904 Griggs Road, Houston, TX 77021 Phone (713) 676-1460 Fax: (713) 676-1460 U.S. EPA ID Number: TXD008950461 ISWR Number: 30900 TCEQ Industrial Solid Waste Permit Number: 30948	☐ CES Environmental Services - Port Arthur Facility 2420 S. Gulfway Dr., Port Arthur, TX 77641 Phone (713) 676-1460 Fax: (713) 676-1460 U.S. EPA ID Number: TXR000079307 ISWR Number: 88585

SECTION 1: Generator Information

Company: PPG Industries, Inc.
Address: 1901 Ave H and 16th Street
City: La Porte **State:** Tx **Zip:** 77571
Contact: Jeffrey Grimes **Title:** EHS Engineer
Phone Number: 281-471-5147 x210 **Fax Number:** 281-470-2985
24/hr Phone Number: 281-471-0943
US EPA ID No: TXD 000356907
State ID No: 30553 **SIC Code:** 2869

SECTION 2: Billing Information - ☐ Same as Above

Company: PO Box 995
Address:
City: La Porte **State:** Tx **Zip:** 77572-0995
Contact: Jeffrey Grimes **Title:** EHS Engineer
Phone Number: 281-471-5147 x210 **Fax Number:** 281-470-2985

SECTION 3: General Description of the Waste

Name of Waste: TBBHPF-PC Production Waste
Detailed Description of Process Generating Waste

Physical State: ☑ Liquid ☐ Sludge ☐ Powder ☐ Solid ☐ Filter Cake ☐ Combination

Color: Varies **Odor:** Hydrocarbon

Specific Gravity (water=1): .9 – 1.14 .98 **Density:** 8-9 lbs/gal

Does this material contain any total phenolic compounds? ☐ Yes ☑ No

Does this material contain any para substituted phenolic compounds? ☐ Yes ☑ No

Is the Waste subject to the benzene waste operation NESHAP? (40 CFR Part 61, Subpart FF) ☐ Yes ☑ No
Answer "Yes" if your waste contains benzene **AND** if the SIC code from your facility is one of the following:

2812	2813	2816	2819	2821	2822	2823	2824	2833	2834
2835	2836	2841	2842	2843	2844	2851	2861	2865	2869
2873	2874	2876	2879	2891	2892	2893	2896	2899	2911
3312	4953	4959	9511						

Layers: ☐ Single-phase ☑ Multi-phase

Container Type: ☐ Drum ☐ Tote ☑ Truck ☐ Other (explain)

Frequency: ☑ Weekly ☐ Monthly ☐ Yearly ☐ One-Time
Quantity:

Is this a USEPA "Hazardous Waste" per 40CFR 261.3? ☑ Yes ☐ No
If "Yes", then please complete, sign and date the Underlying Hazardous Constituents Form attached hereto

If "Yes", Is it: ☑ D001 (Ignitable) ☐ D002 (Corrosive) ☐ D003 (Reactive)
Characteristic for Toxic Metals: ☐ D004 ☐ D005 ☐ D006 ☐ D007 ☐ D008 ☐ D009 ☐ D010 ☐ D011
Characteristic for Toxic Organics: D012 thru D043 (please list all that apply)

Is this an "F" or "K" Listed waste or mixed with one? ☑ Yes ☐ No
If "Yes", then please list ALL applicable codes: F002

per J. Grimes 12/18/08

Is this a commercial product or spill cleanup that would carry a "U" or "P" waste code under 40 CFR 261.33(e) or (f)? ☐ Yes ☑ No
If "Yes", then please list ALL applicable codes:

Texas State Waste Code Number: 0115202H

Proper US DOT Shipping Name: RQ, Waste dichloromethane (F002, D001, Heptane)
Class: 6.1 UN/NA: 1593 PG: III RQ: 1000

Flash Point		pH		Reactive Sulfides		Reactive Cyanides		Solids	
NA		NA		0	mg/l	0	mg/l	0	%
Oil & Grease		TOC		Zinc		Copper		Nickel	
0	mg/l		mg/l	0	mg/l	0	mg/l	0	mg/l

SECTION 4: Physical and Chemical Data

COMPONENTS TABLE	CONCENTRATOIN	UNITS
The waste consists of the following materials	Ranges are acceptable	or %
Water	30 - 35	%
Dichloromethane	15 - 25	%
Heptane	40 - 45	%

EPAHO113001659

SECTION 5: Safety Related Data

If the handling of this waste requires the use of special protective equipment, please explain.

SECTION 6: Attached Supporting Documents

List all documents, notes, data and/or analysis attached to this form as part of the waste approval package.

SECTION 7: Incompatibilities

Please list ALL incompatibilities (if any):

Oxidizers

SECTION 8: Generator's Knowledge Documentation

Laboratory analysis of the hazardous waste characteristics, listed below, **WAS NOT PERFORMED** based upon the following generator knowledge:

TCLP Metals: X
TCLP Volatiles: X
TCLP Semi-Volatiles: X
Reactivity: X
Corrosivity: X
Ignitability: X

SECTION 9: Waste Receipt Classification Under 40 CFR 437 (Prtaining to Pre-Treatment Requirements for Centralized Waste Treatment Facilities)

Is this material a wastewater or wastewater sludge? ☐ YES ☑ NO

If 'Yes', complete this section.

PLEASE CHECK THE APPROPRIATE BOX. IF NO APPROPRIATE CATEGORY, GO TO THE NEXT PAGE.

Metals Subcategory: Subpart A

- ☐ Spent electroplating baths and/or sludges
- ☐ Metal finishing rinse water and sludges
- ☐ Chromate wastes
- ☐ Air pollution control blow down water and sludges
- ☐ Spent anodizing solutions
- ☐ Incineration wastewaters
- ☐ Waste liquid mercury
- ☐ Cyanide-containing wastes greater than 136 mg/l
- ☐ Waste acids and bases with or without metals
- ☐ Cleaning, rinsing, and surface preparation solutions from electroplating or phosphating operations
- ☐ Vibratory deburring wastewater
- ☐ Alkaline and acid solutions used to clean metal parts or equipment

Oils Subcategory: Subpart B

- ☐ Used oils
- ☐ Oil-water emulsions or mixtures
- ☐ Lubricants
- ☐ Coolants
- ☐ Contaminated groundwater clean-up from petroleum sources
- ☐ Used petroleum products
- ☐ Oil spill clean-up
- ☐ Bilge water
- ☐ Rinse/wash waters from petroleum sources

- [ ] Interceptor wastes
- [ ] Off-specification fuels
- [ ] Underground storage remediation waste
- [ ] Tank clean-out from petroleum or oily sources
- [ ] Non-contact used glycols
- [ ] Aqueous and oil mixtures from parts cleaning operations
- [ ] Wastewater from oil bearing paint washes

***Organics Subcategory*: Subpart C**

- [ ] Landfill leachate
- [ ] Contaminated groundwater clean-up from non-petroleum sources
- [ ] Solvent-bearing wastes
- [ ] Off-specification organic product
- [ ] Still bottoms
- [ ] Byproduct waste glycol
- [ ] Wastewater from paint washes
- [ ] Wastewater from adhesives and/or epoxies formulation
- [ ] Wastewater from organic chemical product operations
- [ ] Tank clean-out from organic, non-petroleum sources

(1)

If the waste contains oil and grease at or in excess of 100 mg/L, the waste should be classified in the oils subcategory.

(2)

If the waste contains oil and grease less than 100 mg/L, and has any of the pollutants listed below in concentrations in excess of the values listed below, the waste should be classified in the metals subcategory.

Cadmium: 0.2 mg/L
Chromium: 8.9 mg/L
Copper: 4.9 mg/L
Nickel: 37.5 mg/L

(3)

If the waste contains oil and grease less than 100 mg/L, and does not have concentrations of cadmium, chromium, copper, or nickel above any of the values listed above, the waste should be classified in the organics subcategory.

- [ ] Metals Subcategory
- [ ] Oils Subcategory
- [ ] Organics Subcategory

SECTION 10 Additional Instructions

If you cannot determine the correct subcategory in Section 9and you did not furnish data for the concentration of Cadmium, Chromium, Copper, Nickel, and Oil and Grease, CES will send offsite to a commercial laboratory a sample to determine these concentrations. This will be prior to acceptance. The generator will be responsible for the cost of the analysis.

SECTION 11: Generator's Certification

The information contained herein is based on [x] generator knowledge and/or [ ] analytical data.
I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no deliberate or willful omissions of compostion properties exist and that all known or suspected hazards have been disclosed. I certify that the materials tested are representative of all materials described by this document.

Authorized Signature: [signature] **Date:** 11/24/2008

Printed Name/Title: Jeffrey Grimes / EHS Engineer

CES USE ONLY (DO NOT WRITE IN THIS SPACE)
Compliance Officer: [signature]
Date: 12-5-08 [x] Approved [ ] Rejected
Approval Number: 3101

CES Environmental Services, Inc.

LDR Notifications/Certifications

1. Generator Information

Name: PPG Industries
Address: 1901 Ave H. @ 16th street
La Porte, TX 77572
EPA ID No.: TXD000356907
Manifest No.:

2. Receiving Facility Information

Name: CES Environmental Services, Inc.
Address: 4904 Griggs Road
Houston, TX 77021
EPA ID No.: TXD008950461

3. Waste Description at Point of Generation

Line Item	Waste Description	Hazardous Waste Codes	LDR Subcategory	WW / NWW	Underlying Hazardous Constituents [268.2(i)]
1	Heptane / Dichloromethane	F002, D001		NWW	
2					
3					
4					
5					

4. Waste Disposition

Line Item	Subtitle C Exclusion Subsequent to Point of Generation (if applicable)	Current Disposition of Waste	268.45, Table 1 Technology used to treat debris (if applicable)	Date Shipped
1				
2				
3				
4				
5				

5. Was the waste hazardous at the point of generation but subsequently became excluded from the definition of hazardous waste or exempt from Subtitle C regulation (including characterstic wastes managed in wastewater treatment systems discharging under the CWA)?
☐ Yes ☒ No (If yes, this constituents the 268.7(a)(7) one-time notification.)

6. Waste the waste characterstic at the point of generation, treated onsite to remove the characterstic, and treatment residues then shipped to a Subtitle D land disposal facility? ☐ Yes ☒ No (if yes, complete Certification 1 or 2.)

7. Was the waste "debris" that was hazardous at the point of generation but subsequently became excluded from the definition of hazardous waste under 261.3(f)(1) by treating it using an extraction or destruction technology in 268.45, Table 1? ☐ Yes ☒ No (if yes, complete Certification 3.)

8. Was the waste "debris" that was hazardous at the point of generation but subsequently became excluded from the definition of hazardous waste under 261.3(f)(2) by receiving a "no-longer-contains" determinatin from EPA or the authorized state?
☐ Yes ☒ No (if yes, this constituents the 268.7(d)(1) one-time notification.)

9. Is the waste residue from treating K061, K062 and/or F006 wastes in high-temperature metals recovery (HTMR) units that 1) meets the generic exclusion levels in 261.3(c)(2)(ii)(C), 2) does not exhibit any characterstics, and 3) is shipped to a Subtitle D land disposal facility?
☐ Yes ☒ No (if yes, complete Certification 4.)

10. ☐ Waste that has been treated to remove a characterstic and meets underlying hazardous constituents standards.

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characterstics and that underlying hazardous constituents, as defined in 268.2(i) have been treated on-site to meet the 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Applies to items:
Reference: 268.7(b)(4)(v) and 268.9(d)

11. ☐ Waste that has been treated to remove a characterstic but does not meet underlying hazardous constituents standards.

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 or 268.49 to remove the hazardous characterstic. This decharacterized waste contains underlying hazardous constituents that require further treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Applies to items:
Reference: 268.7(b)(4)(v) and 268.9(d)

12. ☐ Debris that has been treated to meet the alternative treatment standards.

I certify under penalty of law that the debris has been treated in accordance with the requirements of 40 CFR 268.45. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Applies to items:
Reference: 268.7(b)(4)(v) and 268.9(d)

13. ☐ HTMR residue from treating K061, K062 and/or F006 wastes.

I certify under penalty of law that the generic exclusion levels for all constituents have been met without impermissible dilution and that no characterstic of hazardous waste is exhibited. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Applies to items:
Reference: 268.7(b)(4)(v) and 268.9(d)

Authorized Signature: [signature] **Date:** 12/18/08

Printed Name / Title: Jeff Grimes / EHS Engineer

JUN 1 8 2007

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 5, 2007

Mr. Matt Bowman
CES Environmental Services, Inc.
4904 Griggs Road
Houston, TX 77021-3208

Re: CES Environmental Services, Inc.
Solid Waste Registration Number: 30900
Central Registry Customer/Reference Number: CN600618946 / RN100693282
Mail Log Number: 7561

Dear Mr. Bowman:

This is in response to correspondence dated May 23, 2007 notifying the Texas Commission on Environmental Quality (TCEQ) that your facility intends to receive and recycle a mixture of water, methanol, and methylene chloride from pharmaceutical manufacturing. The TCEQ appreciates your notification.

The information contained in the notification satisfies the notification requirements in 30 Texas Administrative Code (TAC) Section (§)335.6. The notification has been forwarded to the Industrial and Hazardous Waste Section of Record Services.

The TCEQ would like to remind you that your facility remains responsible for insuring that:

- The subject waste is managed in accordance with 30 TAC §335.4 (General Prohibitions) and §26.121 of the Texas Water Code; and
- Should any changes occur or additional information come to light concerning
  (1) the composition of the waste
  (2) the process by which the waste is generated
  (3) the manner in which the waste is managed or
  (4) any other information referenced in 30 TAC §335.6 is provided to the TCEQ.

Please note that this letter is not an approval of the subject recycling activity. It is only an acknowledgment of the notification to the TCEQ of that activity.

If you have any questions regarding this matter please contact me at (512) 239-6412. If responding by letter, please use Mail Code (MC-130) in the address.

Sincerely,

M. Scott Green

Scott Green, Project Manager
Industrial and Hazardous Waste Permit Section
Waste Permits Division

MSG/ff

CES Environmental Services, Inc.

PROCESS FACILITY INFORMATION (CES USE ONLY)!!!

1. Base Pricing (including freight):

.30/lb processing
#300/load + CESC.

2. Contamination Limit (maximum limit before surchages apply):

3. Surcharge Pricing:

4. Special Testing Requirements:

5. Treatment and Handling Protocol:

6. Treated Wastewater Discharge Subcategory:

☐ Subcategory A ☐ Subcategory B ☐ Subcategory C

CES Environmental Services, Inc.

PROCESS FACILITY INFORMATION (CES USE ONLY)!!!

7. Tests for Product Recovered/Recycled (if applicable):

8. Management for Product Recovered/Recycled (if applicable)

JR/KK

CES Environmental Services, Inc.

4904 Griggs Road Houston, TX 77021
Phone: (713) 676-1460 Fax: (713) 676-1676
http://www.cesenvironmental.com
TCEQ Industrial Solid Waste Permit No: 30948
U.S. EPA ID No: TXD008950461 ISWR No: 30900

SECTION 1: Generator Information

Company: PPG Inustries, nc.
Address: 1901 Avenue H & 16th Street
City, State, Zip: La Porte, Tx 77571
Contact: Jeffrey Grimes Title: Environmental Engineer
Phone No: 281-471-5147 x210 Fax No: 281-470-2985
24/hr Phone: 281-471-0943
U.S. EPA I.D. No: TXD000356907
State I.D. 30553 SIC Code: 2869

SECTION 2: Billing Information – ☒ Same as Above

Company:
Address:
City, State, Zip:
Contact: Title:
Phone No: Fax No:

SECTION 3: General Description of the Waste

Name of Waste: Methylene chloride aqueous waste
Detailed Description of Process Generating Waste: Polycarbonate production

Physical State: ☒ Liquid ☐ Sludge ☐ Powder ☐ Solid ☐ Filter Cake ☐ Combination

Color: clear to slight miky color Odor: mild organic

Specific Gravity (water=1): ≥1 Density: ~~unknown~~ 9-10

F002, F003, D001

Layers: ☐ Single-phase ☒ Multi-phase

Container Type: ☐ Drum ☐ Tote ☒ Truck ☐ Other (explain)
Container Size: 45,000

J. Grimes 12/18/08

Frequency: ☐ Weekly ☒ Monthly ☐ Quarterly ☐ Yearly
Number of Units (containers): 1 Other: almost daily during period of production
Texas State Waste Code No: PRODUCT 0115202H
Proper U.S. DOT Shipping Name: RQ, waste Dichloromethane (F002, F003, D001, methanol)
Class: 6.1 UN/NA: UN1593 PG: III RQ: 10

Flash Point	pH	Reactive Sulfides	Reactive Cyanides	Solids
>150	3-11	>20 mg/l	>20 mg/l	0 %

Oil&Grease	TOC	Zinc	Copper	Nickel
NA mg/l	NA mg/l	NA mg/l	NA mg/l	NA mg/l

EPAHO113001666

SECTION 4: Physical and Chemical Data

COMPONENTS/TABLE The waste consists of the following materials	Concentration Ranges are acceptable	Units or %
dichloromethane		61
Methanol		19
water		21

SECTION 5: Safety Related Data

If the handling of this waste requires the use of special protective equipment, please explain.
see MSDS

SECTION 6: Attached Supporting Documents

List all documents, notes, data, and/or analysis attached to this form as part of the waste approval package.
See MSDS

SECTION 7: Incompatibilities

Please list all incompatibilities (if any):
See MSDS

SECTION 8: Generator's Knowledge Documentation

Laboratory analysis of the hazardous waste characteristics, listed below, WAS NOT PERFORMED based upon the following generator knowledge:

TCLP Metals: X
TCLP Volatiles: X
TCLP Semi-Volatiles: X
Reactivity: X
Corrosivity: X
Ignitability: X

SECTION 9: Generator's Certification

The information contained herein is based on ☒ generator knowledge and/or ☐ analytical data. I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no deliberate or willful omissions of composition properties exist and that all known or suspected hazards have been disclosed. I certify that the materials tested are representative of all materials described by this document.

Authorized Signature: [signature] **Date:** 6/29/2007

Printed Name/Title: Jeffrey Grimes/Environmental Engineer

CES USE ONLY (DO NOT WRITE IN THIS SPACE)	Process Facility Information:
Compliance Officer: [signature]	7 Trans
Date: 6/29/07 Approved Rejected	$0.10/lb ; $300/load +FSC
	washout $225
Approval Number: 2281	RECYCLE

EPAHO113001667

SECTION 10: Waste Receipt Classification Under 40 CFR 437

Is this material a wastewater or wastewater sludge? ☐ YES ☒ NO

If 'Yes', complete this section.

PLEASE CHECK THE APPROPRIATE BOX. IF NO APPROPRIATE CATEGORY, GO TO THE NEXT PAGE.

Metals Subcategory: Subpart A

- ☐ Spent electroplating baths and/or sludges
- ☐ Metal finishing rinse water and sludges
- ☐ Chromate wastes
- ☐ Air pollution control blow down water and sludges
- ☐ Spent anodizing solutions
- ☐ Incineration wastewaters
- ☐ Waste liquid mercury
- ☐ Cyanide-containing wastes greater than 136 mg/l
- ☐ Waste acids and bases with or without metals
- ☐ Cleaning, rinsing, and surface preparation solutions from electroplating or phosphating operations
- ☐ Vibratory deburring wastewater
- ☐ Alkaline and acid solutions used to clean metal parts or equipment

Oils Subcategory: Subpart B

- ☐ Used oils
- ☐ Oil-water emulsions or mixtures
- ☐ Lubricants
- ☐ Coolants
- ☐ Contaminated groundwater clean-up from petroleum sources
- ☐ Used petroleum products
- ☐ Oil spill clean-up
- ☐ Bilge water
- ☐ Rinse/wash waters from petroleum sources
- ☐ Interceptor wastes
- ☐ Off-specification fuels
- ☐ Underground storage remediation waste
- ☐ Tank clean-out from petroleum or oily sources
- ☐ Non-contact used glycols
- ☐ Aqueous and oil mixtures from parts cleaning operations
- ☐ Wastewater from oil bearing paint washes

Organics Subcategory: Subpart C

- ☐ Landfill leachate
- ☐ Contaminated groundwater clean-up from non-petroleum sources
- ☐ Solvent-bearing wastes
- ☐ Off-specification organic product
- ☐ Still bottoms
- ☐ Byproduct waste glycol
- ☐ Wastewater from paint washes
- ☐ Wastewater from adhesives and/or epoxies formulation
- ☐ Wastewater from organic chemical product operations
- ☐ Tank clean-out from organic, non-petroleum sources

(1) If the waste contains oil and grease at or in excess of 100 mg/L, the waste should be classified in the oils subcategory.

(2) If the waste contains oil and grease less than 100 mg/L, and has any of the pollutants listed below in concentrations in excess of the values listed below, the waste should be classified in the metals subcategory.

Cadmium: 0.2 mg/L
Chromium: 8.9 mg/L
Copper: 4.9 mg/L
Nickel: 37.5 mg/L

(3) If the waste contains oil and grease less than 100 mg/L, and does not have concentrations of cadmium, chromium, copper, or nickel above any of the values listed above, the waste should be classified in the organics subcategory.

☐ Metals Subcategory

☐ Oils Subcategory

☐ Organics Subcategory

SECTION 11: Additional Instructions

If you cannot determine the correct subcategory in Section 9 and you did not furnish data for the concentration of Cadmium, Chromium, Copper, Nickel, and Oil and Grease, CES will send offsite to a commercial laboratory a sample to determine these concentrations. This will be prior to acceptance. The generator will be responsible for the cost of the analysis.

Vulcan CHEMICALS

MATERIAL SAFETY DATA SHEET

24 Hour Emergency Phone (316) 524-5751

Division of Vulcan Materials Company / P. O. Box 530390 • Birmingham, AL 35253-0390

I – IDENTIFICATION

CHEMICAL NAME	CHEMICAL FORMULA	MOLECULAR WEIGHT
Dichloromethane	CH_2Cl_2	84.94
TRADE NAME		
Methylene Chloride, Special Grade, Aerosol Grade, Degreasing Grade		
SYNONYMS	DOT IDENTIFICATION NO.	
Methylene Chloride	UN 1593	

II – PRODUCT AND COMPONENT DATA

COMPONENT(S) CHEMICAL NAME	CAS REGISTRY NO.	% (wt.) Approx.	OSHA PEL
* Dichloromethane	75-09-2	> 98	500 ppm
* Propylene oxide	75-56-9		100 ppm

Vulcan Chemicals recommends that its customers minimize employee exposure. Vulcan therefore suggests that its customers consider adopting the lower of the current OSHA PEL or the ACGIH TLVs for the purpose of evaluating employee exposures. The TLVs recommended by the ACGIH have been updated on a continuing basis. See Section VI.

* Denotes chemical subject to reporting requirements of Section 313 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) and 40 CFR Part 372

III – PHYSICAL DATA

APPEARANCE AND ODOR	SPECIFIC GRAVITY
Clear, colorless liquid; mildly sweet odor	1.31 @ 25/25°C
BOILING POINT	VAPOR DENSITY IN AIR (Air = 1)
103.1°F (39.5°C)	2.9
VAPOR PRESSURE	% VOLATILE, BY VOLUME
352 mm Hg @ 20°C	100
EVAPORATION RATE	SOLUBILITY IN WATER
(ether = 1): 0.7	1.32 gm/100 gm @ 25°C

IV – REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
Stable	Avoid contact with open flame, electric arcs, or other hot surfaces which can cause thermal decomposition.

INCOMPATIBILITY (Materials to avoid)

Strong alkalies, oxygen, nitrogen peroxide, sodium, potassium, and other oxidizers and reactive metals. Refer to Section VIII for additional information on aluminum.

HAZARDOUS DECOMPOSITION PRODUCTS

Hydrogen chloride, phosgene, chlorine.

HAZARDOUS POLYMERIZATION

Will not occur.

V – FIRE AND EXPLOSION HAZARD DATA

FLASHPOINT (Method used)	FLAMMABLE LIMITS IN AIR
None (TCC)	12 - 19% (Vol.) @ 100°C

EXTINGUISHING AGENTS
Water fog, dry chemical, foam, carbon dioxide

NFPA Hazard Ratings:
Health 2, Flammability 1, Reactivity 0

UNUSUAL FIRE AND EXPLOSION HAZARDS Concentrated vapors can be ignited by high intensity ignition source. Firefighters should wear self-contained positive pressure breathing apparatus due to thermal decomposition products, and avoid skin contact.

VI – TOXICITY AND FIRST AID

EXPOSURE LIMITS (When exposure to this product and other chemicals is concurrent, the exposure limit must be defined in the workplace.)

Methylene Chloride: ACGIH: 50 ppm TWA (8 hr) OSHA: 500 ppm TWA (8 hr) 1,000 ppm Ceiling (Odor threshold approximately 200-300 ppm; causes olfactory fatigue).

Propylene Oxide: ACGIH: 20 ppm TWA (8 hr) OSHA: 100 ppm (8 hr) TWA
Consumption of alcoholic beverages may increase the potential for development of toxic effects resulting from exposure to this product.

Effects described in this section are believed not to occur if exposures are maintained at or below appropriate TLVs.
Because of the wide variation in individual susceptibility, these exposure limits may not be applicable to all persons and those with medical conditions listed below.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Alcoholism, acute and chronic liver and kidney disease, chronic lung disease, anemia, coronary disease or rhythm disorders of the heart.

ACUTE TOXICITY Primary route(s) of exposure: ☐ Inhalation ☐ Skin Absorption ☐ Ingestion

Inhalation: Major route of potential exposure. Methylene chloride depresses the central nervous system. Concentrations between 900-1,000 ppm may cause dizziness. Nausea, headache, and vomiting can occur at concentrations above 2,000 ppm. At 7,000 ppm, numbness and tingling in arms and legs and rapid heartbeat have occurred. Loss of consciousness and death have occurred at levels above 9,000 ppm, if exposure is prolonged.

Carboxyhemoglobin levels can be elevated in persons exposed to methylene chloride and can cause a substantial stress on the cardiovascular system. This elevation can be additive to the increase caused by smoking and other carbon monoxide sources.

Skin: Liquid methylene chloride is painful and irritating if confined to skin by gloves, clothing, etc. Prolonged or repeated contact may cause irritation, defatting of skin, and dermatitis. Absorption through intact skin is possible if contact with liquid is prolonged.

Propylene oxide as a pure substance, has caused allergic reaction if repeated contact occurs.

Eyes: Liquid may cause temporary irritation with temporary corneal injury. Vapors may irritate eyes.

Ingestion: Single dose toxicity low to moderate. If vomiting occurs, methylene chloride can be aspirated into lungs, which can cause chemical pneumonia and systemic effects.

FIRST AID

Inhalation: Remove to fresh air. If breathing has stopped, administer artificial respiration. Call a physician.
Skin: Remove contaminated clothing and shoes. Wash exposed area thoroughly with soap and water for at least 15 minutes. Wash contaminated clothing before reuse.
Eyes: Flush eyes immediately with water for at least 15 minutes. If irritation persists, call a physician.
Ingestion: Do not induce vomiting. Contact physician or emergency medical facility immediately.

NOTE TO PHYSICIAN: Adrenalin should never be given to person overexposed to methylene chloride.

CHRONIC TOXICITY

The finding of chronic toxic effects in laboratory animals may indicate toxicity to humans. Overexposure should be avoided, failure to do so could result in injury, illness or even death. Chronic overexposures to methylene chloride have caused liver and kidney toxic effects in experimental animals.

Carcinogenicity: Methylene chloride has been evaluated for possible cancer causing effects in laboratory animals. Inhalation studies at concentrations of 2,000, and 4,000 ppm increased the incidence of malignant liver and lung tumors in mice. Three inhalation studies of rats have shown increased incidence of benign mammary gland tumors in female rats at concentrations of 500 ppm and above and increases in benign mammary gland tumors in males at concentrations of 1,500 ppm and above. Rats exposed to 50 and 200 ppm via inhalation showed no increased incidence of tumors. Mice and rats exposed by ingestion at levels up to 250 mg/kg/day lifetime and hamsters exposed via inhalation to concentrations up to 3,500 ppm lifetime did not show an increased incidence of tumors.

Propylene oxide has caused increased incidence of nasal tumors in rats exposed by inhalation, forestomach tumors in rats exposed by gavage (forced-fed in oil) and injection site tumors when injected under the skin of rats.

The International Agency for Research on Cancer (IARC) has concluded that, with respect to methylene chloride, there is sufficient evidence of the carcinogenicity to experimental animals and inadequate evidence of the carcinogenicity to humans, resulting in a classification as a 2B animal carcinogen. The NTP has identified methylene chloride as an animal carcinogen. Methylene chloride and propylene oxide are listed on the IARC and NTP carcinogen lists but not by OSHA. The State of California has listed methylene chloride under Proposition 65 as a chemical known to the state to cause cancer.

Epidemilogy studies of 751 humans chronically exposed to methylene chloride, in the workplace of which 252 were exposed for a minimum of 20 years did not demonstrate any increase in deaths caused by cancer or cardiac problems. A second study of 2,227 workers confirmed these results.

Reproductive Toxicity: Reproductive toxicity tests have been conducted to evaluate the potential adverse effects methylene chloride may have on reproduction and offspring of laboratory animals. The results indicate that methylene chloride does not cause birth defects in laboratory animals.

VII – PERSONAL PROTECTION AND CONTROLS

RESPIRATORY PROTECTION

Where vapor concentration exceeds or is likely to exceed 50 ppm methylene chloride, an approved full face respirator with organic vapor cannister is acceptable. Approved self-contained breathing apparatus or air line respirator, with full facepiece, is required for methylene chloride concentrations above 1,000 ppm and for spills and/or emergencies. Follow any applicable respirator use standards and regulations.

VENTILATION

Do not use in closed or confined space. Open doors and/or windows. Use ventilation to maintain exposure levels of methylene chloride below 50 ppm (TWA).

SKIN PROTECTION

Wear solvent-resistant gloves such as Viton, polyvinyl alcohol, or equivalent. Solvent-resistant boots, apron, headgear and/or faceshield should be worn where splashing is possible.

EYE PROTECTION

Wear safety glasses. Contact lenses should not be worn. Chemical goggles and/or face shields should be worn where splashing is possible.

HYGIENE

Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom.

OTHER CONTROL MEASURES

To determine exposure level(s), monitoring should be performed regularly. Safety shower and eyewash station should be available.
NOTE: Protective equipment and clothing should be selected, used, and maintained according to applicable standards and regulations. For further information, contact the clothing or equipment manufacturer or the Vulcan Chemicals Technical Service department.

VIII - STORAGE AND HANDLING PRECAUTIONS

Follow protective controls set forth in Section VII when handling this product.
Store labeled sealed containers in a cool, dry, well-ventilated area out of sunlight. Prevent water or moist air from entering storage tanks or containers. Do not cut or weld on empty or full drums. Aluminum equipment should not be used for storage and/or transfer. Contact with aluminum parts in a pressurizable fluid system may cause violent reactions. Consult equipment supplier for further information. Vapors are heavier than air and will collect in low areas. Do not enter confined spaces such as tanks or pits without following proper entry procedures as required by 29 CFR 1910.146.
Do not remove or deface label. Do not reuse drum without recycling or reconditioning in accordance with any applicable federal, state or local laws.

SARA Title III Hazard Categories: Immediate Health, Delayed Health

IX - SPILL, LEAK AND DISPOSAL PRACTICES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Evacuate the area, ventilate, and avoid breathing vapors. Dike area to contain spill. If spill occurs indoors, turn off air conditioning and/or heating system, to prevent vapors from contaminating entire buidling. Clean up area (wear protective equipment - refer to Section VII) by mopping or with absorbent material and place in closed containers for disposal. Avoid contamination of ground and surface waters. Do not flush to sewer. Reportable Quantity (RQ) is 1000 lbs. Notify National Response Center (800/424-8802) of uncontained releases to the environment in excess of the RQ.

WASTE DISPOSAL METHOD

Recovered liquids may be sent to a licensed reclaimer or incineration facility. Contaminated material must be disposed of in a permitted waste management facility. Consult federal, state, or local disposal authorities for approved procedures.

X - TRANSPORTATION

DOT HAZARD CLASSIFICATION

Dichloromethane, 6.1, UN 1593, PG III, RQ

PLACARD REQUIRED

KEEP AWAY FROM FOOD, 1593, Class 6

LABEL REQUIRED

KEEP AWAY FROM FOOD, Class 6
Label as required by OSHA Hazard Communication Standard, and any applicable state and local regulations.

Medical Emergencies
Call collect 24 hours a day for emergency toxicological information 415/821-5338

Other Emergency Information
Call 316/524-5751 (24 hours)

For any other information contact:
Vulcan Chemicals
Technical Service Department
P.O. Box 530390
Birmingham, AL 35253-0390
800/873-4898
8 AM to 5 PM Central Time
Monday Through Friday

DATE OF PREPARATION: September 1, 1993

Form 3239-522

Kathleen Hartnett White, *Chairman*
Larry R. Soward, *Commissioner*
H. S. Buddy Garcia, *Commissioner*
Glenn Shankle, *Executive Director*

JUN 08 2007

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 5, 2007

Mr. Matt Bowman
CES Environmental Services, Inc.
4904 Griggs Road
Houston, TX 77021-3208

Re: CES Environmental Services, Inc.
Solid Waste Registration Number: 30900
Central Registry Customer/Reference Number: CN600618946 / RN100693282
Mail Log Number: 7561

Dear Mr. Bowman:

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- Should any changes occur or additional information come to light concerning
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Please note that this letter is not an approval of the subject recycling activity. It is only an acknowledgment of the notification to the TCEQ of that activity.

If you have any questions regarding this matter please contact me at (512) 239-6412. If responding by letter, please use Mail Code (MC-130) in the address.

Sincerely,

M. Scott Green

Scott Green, Project Manager
Industrial and Hazardous Waste Permit Section
Waste Permits Division

MSG/ff

Procedures for handling of PPG water and methylene chloride mixture

1) Stage both trailers, side by side, in the unloading area.
2) Ground both trailers
3) Connect the vapor return lines of both trailers to the scrubber
4) Wearing a full face organic acid respirator, sample the inbound load, top to bottom for an inbound retain sample and to gauge the number of inches of methylene chloride on the bottom of the inbound trailer.
5) Close the dome lid, but do not seal it!
6) Using a 2" hose, connect the inbound trailer to the top connection on the interface vessel.
7) Using a 2" hose, connect the outbound trailer to the bottom connection on the interface vessel (via the centrifugal pump)
8) Slowly decant the methylene chloride from the inbound trailer (in batches) into the interface vessel. Allow to settle for 30 seconds, then pump the settled methylene chloride from the interface vessel into the methylene chloride product trailer.
9) Do this transfer very slowly (in batches) so as not to transfer any of the water into the methylene chloride product trailer. Be sure to empty all the methylene chloride into the interface vessel...it is ok to unload some water from the inbound trailer into the interface vessel to be sure all the methylene chloride has been removed from the inbound trailer.
10) During the transfer, always leave at least 12" of methylene chloride and 12" of water in the interface vessel so that there is sufficient liquid levels on either side of the interface. This will ensure complete separation.
11) When all the methylene choride (and a little of the water) has been removed from the inbound trailer, stop unloading, disconnect all the vapor control lines, shut all valves, lids, etc. Move the inbound trailer (now containing only water and trace levels of solubalized methylene choride to the Main Process Facility for distillation to remove all remaining traces of methylene choride.
12) In the Main Process Facility, be sure the accumulator vessel is hooked up to the scrubber prior to unloading into the distillation tank.
13) Using a 2 or 3" hose, connect the trailer to the distillation tank. Ground the trailer. Crack open the manway on the trailer to allow air to enter the trailer during the unloading process. Using the centrifugal pump of the distillation tank, unload the wastewater into the distillation tank.
14) The trailer, now empty, is ready to be returned to PPG
15) Turn on the steam to the distillation tank. Use the thermometer on the distillation tank and the steam regulator to maintain the temperature at between 120 and 130 degrees F. Continue to boil the Mecl2 off until no more is being received in the accumulator vessel....expect 50 to 80 gallons of per inbound trailer. For the initial few loads, we should test the mecl2 levels in to water to ensure we are getting good removal. Once distillation is finished and the water has been tested (first few loads only), the water should be drained from the distillation tank into the trough for regular wastewater treatment.

16) When it is time to empty the accumulator vessel, disconnect the vapor recovery line and close the vessel. Use a forklift to take the vessel down to the interface vessel. Hook up all vapor recovery lines and unload this accumulator into the interface vessel. Return the accumulator to its place in the Main Processing Area.

Note: We must get a QC report on each load of Mecl2 produced prior to selling.

Matt Bowman

From: Matt Bowman [mbowman@cesenvironmental.com]
Sent: Tuesday, June 12, 2007 5:04 PM
To: 'Grimes, Jeffrey'
Cc: 'larce@cesenvironmental.com'; 'chickman@cesenvironmental.com'; 'Greg Bowman'
Subject: RE: One last question

Concerning the wastewater, this will be addressed as follows:
40 CFR 261.3(2)(iv) and 40 CFR 261.3 (2) (iv) (B) state that "....however, the following mixtures of solid wastes and hazardous wasted listed in subpart D of this part are not hazardous wastes....if the generator can demonstrate that the mixture cosists of wastewater the sicharge of which is subject to regulation under either section 402 or section 307 (b) of the Clean Water Act...and; One or more of the following spent solvents listed in 261.31 - methylene chloride,.......provided that the maximum total weekly usage of these solvents (other than the amounts that can be demonstrated that not to be discharged to wastewater)divided by the average weekly flow of wqastewater in to the headworks of the facility's wastewater treatment or pretreatment system does not exceed 25 parts per million."

Concerning the residues, they will have to be managed as F002 hazardous waste. However, I expect little if any residues based on our system of treatment and management.

Also, I need to know by tomorrow if we are going to proceed with the project in order to be prepared in time. Please advise me immediately as to the status so we can make the proper preparations.

Best Regards,
Matt

-----Original Message-----
From: Grimes, Jeffrey [mailto:jgrimes@ppg.com]
Sent: Tuesday, June 12, 2007 9:27 AM
To: mbowman@cesenvironmental.com
Subject: One last question

Matt,

You state the residue from wastewater treatment will be sent out as non-haz. How can you do this in light of the fact it will be derived from a listed, F002, waste?

Thanks,

Jeff

IN the state of Texas, you are allowed to recycle hazardous wastes without a permit under certain restrictive conditions. The main condition is that you do not store them prior to processing/recycling. As you request, we must be able to prove that we meet the definition of a designated facility per 40 CFR 262.20. This states "a generator must designate on the manifest one facility which is permitted to handle the waste described on the manifest".

Now, referring to 30 TAC, 335.1(32), this section defines a designated facility as such: "Designated facility - A Class 1 or hazardous waste storage, processing, or disposal facility which has received an EPA permit (or a facility with interim status) in accordance with the requirements of 40 CFR Parts 270 and 124; a permit from a state authorized in accordance with 40 CFR Part 271 (in the case of hazardous waste); a permit issued pursuant to 335.2 of this title (relating to Permit Required (in the case of nonhazardous waste); or that is regulated under 335.24(f), (g), or (h) of this title (relating to Requirements for Recyclable Materials and Nonhazardous Recyclable Materials) ...."

Accordingly, CES, having met the conditions listed in 335.24(f)(1) and (2), can be used as a "designated facility" by PPG to receive and recycle the hazardous waste ("Recyclable Material" in this case).

If you have further questions, please continue to direct them to my attention!

Matt

-----Original Message-----
From: Grimes, Jeffrey [mailto:jgrimes@ppg.com]
Sent: Tuesday, June 12, 2007 10:01 AM
To: mbowman@cesenvironmental.com
Subject: Ok, not the last question
Importance: High

Matt,

GO legal also wants to know what permits you have in place that allow you to comply with 262.20(b) - manifest to a designated facility that is permitted to treat, store, dispose (recycle in your case) hazardous waste. Have you received hazardous wastes on manifests before and under what circumstances.

Thanks

Jeff

CES Environmental Services, Inc.

LDR Notifications/Certifications

1. Generator Information		2. Receiving Facility Information	
Name:	PPG Industries	Name:	CES Environmental Services, Inc.
Address:	1901 Ave H. @ 16th street	Address:	4904 Griggs Road
	La Porte, TX 77572		Houston, TX 77021
EPA ID No.:	TXD000356907	EPA ID No.:	TXD008950461
Manifest No.:			

3. Waste Description at Point of Generation

Line Item	Waste Description	Hazardous Waste Codes	LDR Subcategory	WW / NWW	Underlying Hazardous Constituents [268.2(i)]
1	Methanol / Dichloromethane	F002, F003, D001		NWW	
2					
3					
4					
5					

4. Waste Disposition

Line Item	Subtitle C Exclusion Subsequent to Point of Generation (if applicable)	Current Disposition of Waste	268.45, Table 1 Technology used to treat debris (if applicable)	Date Shipped
1				
2				
3				
4				
5				

5. Was the waste hazardous at the point of generation but subsequently became excluded from the definition of hazardous waste or exempt from Subtitle C regulation (including characterstic wastes managed in wastewater treatment systems discharging under the CWA)?
☐ Yes ☒ No (If yes, this constituents the 268.7(a)(7) one-time notification.)

6. Waste the waste characterstic at the point of generation, treated onsite to remove the characterstic, and treatment residues then shipped to a Subtitle D land disposal facility? ☐ Yes ☒ No (if yes, complete Certification 1 or 2.)

7. Was the waste "debris" that was hazardous at the point of generation but subsequently became excluded from the definition of hazardous waste under 261.3(f)(1) by treating it using an extraction or destruction technology in 268.45, Table 1? ☐ Yes ☒ No (if yes, complete Certification 3.)

8. Was the waste "debris" that was hazardous at the point of generation but subsequently became excluded from the definition of hazardous waste under 261.3(f)(2) by receiving a "no-longer-contains" determinatin from EPA or the authorized state?
☐ Yes ☒ No (if yes, this constituents the 268.7(d)(1) one-time notification.)

9. Is the waste residue from treating K061, K062 and/or F006 wastes in high-temperature metals recovery (HTMR) units that 1) meets the generic exclusion levels in 261.3(c)(2)(ii)(C), 2) does not exhibit any characterstics, and 3) is shipped to a Subtitle D land disposal facility?
☐ Yes ☒ No (if yes, complete Certification 4.)

10. ☐ Waste that has been treated to remove a characterstic and meets underlying hazardous constituents standards.

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characterstics and that underlying hazardous constituents, as defined in 268.2(i) have been treated on-site to meet the 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Applies to items:
Reference: 268.7(b)(4)(v) and 268.9(d)

11. ☐ Waste that has been treated to remove a characterstic but does not meet underlying hazardous constituents standards.

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 or 268.49 to remove the hazardous characterstic. This decharacterized waste contains underyling hazardous constituents that require further treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Applies to items:
Reference: 268.7(b)(4)(v) and 268.9(d)

12. ☐ Debris that has been treated to meet the alternative treatment standards.

I certify under penalty of law that the debris has been treated in accordance with the requirements of 40 CFR 268.45. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Applies to items:
Reference: 268.7(b)(4)(v) and 268.9(d)

13. ☐ HTMR residue from treating K061, K062 and/or F006 wastes.

I certify under penalty of law that the generic exclusion levels for all constituents have been met without impermissible dilution and that no characterstic of hazardous waste is exhibited. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Applies to items:
Reference: 268.7(b)(4)(v) and 268.9(d)

Authorized Signature: ______________________ **Date:** ______________

Printed Name / Title: ______________________

CES Environmental Services, Inc.

PROCESS FACILITY INFORMATION (CES USE ONLY)!!!

1. Base Pricing (including freight):

.14/lb processing
$300/load + FSC

2. Contamination Limit (maximum limit before surchages apply):

3. Surcharge Pricing:

4. Special Testing Requirements:

5. Treatment and Handling Protocol:

6. Treated Wastewater Discharge Subcategory:

☐ Subcategory A ☐ Subcategory B ☐ Subcategory C

CES Environmental Services, Inc.

PROCESS FACILITY INFORMATION (CES USE ONLY)!!!

7. Tests for Product Recovered/Recycled (if applicable):

8. Management for Product Recovered/Recycled (if applicable)

LAB
T-32
8/4/09
CE

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 9-17-08 JOB Number (or other type of information): SIB Treated Sample

Customer, Product Description, Other Information

PRODUCT: 1 part SIB
4 parts Citgo
2 parts MTBE

Density (S.G.)	Product Physical Characteristics Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other

STARTING VOLUME: 700 mls

OTHER INFORMATION:
7 parts 500 mls tank Sample
200 ml MTBE

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

→ 10% 1/10 2 H_2O_2: 70 ml

→ Acid to a pH of 6 ~~[illegible]~~ F

~~5ml~~ 102°F

~~10ml~~ 115°F

15ml ~~[illegible]~~1°F 121°F

17ml pH = 8

~~18ml~~ 105 pH - 6.34

19ml pH = 5.00

pH = ~~4.68~~ 5.14

Product Processing Log Sheet, Edited, MASTER, 5-1-2008

GRP.

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: ____________ **JOB Number (or other type of information):** ____________

Customer, Product Description, Other Information

PRODUCT :

	Product Physical Characteristics					
Density (S.G.)	**Boiling Point (F,C) / pH**	**Sulfide**	**Mercaptan**	**Other**	**Other**

OTHER INFORMATION:

STARTING VOLUME: ____________

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: ______________ JOB Number (or other type of information): ______________________________

Customer, Product Description, Other Information

PRODUCT :

	Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other

OTHER INFORMATION:

STARTING VOLUME: ______________

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: ____________ JOB Number (or other type of information): ____________

Customer, Product Description, Other Information

PRODUCT :

	Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other

OTHER INFORMATION:

STARTING VOLUME: ____________

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: ______________ JOB Number (or other type of information): ______________________________

Customer, Product Description, Other Information

PRODUCT :

	Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other

OTHER INFORMATION:

STARTING VOLUME: ______________

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: ____________ JOB Number (or other type of information): ____________

Customer, Product Description, Other Information

PRODUCT :

	Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other

OTHER INFORMATION:

STARTING VOLUME: ____________

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: ______________ **JOB Number (or other type of information):** ______________

Customer, Product Description, Other Information

PRODUCT :

Product Physical Characteristics						
	Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other

OTHER INFORMATION:

STARTING VOLUME: ______________

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: ____________ JOB Number (or other type of information): ____________________

Customer, Product Description, Other Information

PRODUCT :

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other

OTHER INFORMATION:

STARTING VOLUME: ____________

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: ______________ JOB Number (or other type of information): ______________

Customer, Product Description, Other Information

PRODUCT :

	Product Physical Characteristics				
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other

OTHER INFORMATION:

STARTING VOLUME: ______________

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: ______________ **JOB Number (or other type of information):** ______________________________

Customer, Product Description, Other Information

PRODUCT :

	Product Physical Characteristics				
Density (S.G.)	**Boiling Point (F,C) / pH**	**Sulfide**	**Mercaptan**	**Other**	**Other**

OTHER INFORMATION:

STARTING VOLUME: ______________

PROCESSING INFORMATION

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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 9-5 JOB Number (or other type of information): 71252 (7253)

Customer, Product Description, Other Information

PRODUCT : SIB (61)

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other
1.3410	10.93	5.11%	3.14	5.21	

OTHER INFORMATION: 26480 Lbs

STARTING VOLUME:

PROCESSING INFORMATION

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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: ____________ JOB Number (or other type of information): ____________

Customer, Product Description, Other Information

PRODUCT :

	Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other
					5.7%	

OTHER INFORMATION: S= 19,380 ~~12,870~~
RSH= 16,370 ~~35,820~~

STARTING VOLUME: ____________

PROCESSING INFORMATION

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PROCESSING NOTES:

GRP.

EPAHO113001694

60

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 09/03/08 **JOB Number (or other type of information):** 71250 (TRL 7253)

Customer, Product Description, Other Information

PRODUCT : SIB (60)

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaoH	Other
1.36	11.06	6.47%	1.44%	5.34%	

OTHER INFORMATION: 43460

STARTING VOLUME: ______

PROCESSING INFORMATION

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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 9-2-08 JOB Number (or other type of information): 71249 TRL 7253

Customer, Product Description, Other Information

PRODUCT : S1B

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other Oil
1.34	11.36	5.344%	10.727%	5.221%	2%

STARTING VOLUME: 44440

OTHER INFORMATION:

44440

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 8-29-08 **JOB Number (or other type of information):** 70891 (TRL 7253)

Customer, Product Description, Other Information 2% oil

PRODUCT: SIB

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	% NaOH ~~Other~~ NaOH	Oil ~~Other~~
1.30	10.36	8.034%	16.067%	5.505%	2%

STARTING VOLUME: 48780

OTHER INFORMATION:

PROCESSING INFORMATION

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PROCESSING NOTES:

57

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 08-28-08 **JOB Number (or other type of information):** 70892 trl. 239

Customer, Product Description, Other Information

PRODUCT : SIB

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other
	10.77	50,050	34,100	4.33%	

STARTING VOLUME: SIB 2804

OTHER INFORMATION:
32,940 Lb

PROCESSING INFORMATION

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PROCESSING NOTES:
~~75~~ Oil
Oil density = .950

56

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

7283

Date: 8-28 JOB Number (or other type of information): 70890 (TRL ~~70890~~)

Customer, Product Description, Other Information

PRODUCT : S 1B

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other
	Product Physical Characteristics				
1.31	10.64	64980	129960	4.63	

OTHER INFORMATION:

34760

STARTING VOLUME:

PROCESSING INFORMATION

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PROCESSING NOTES:

55

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 08-27-08 **JOB Number (or other type of information):** 70889 (239)

Customer, Product Description, Other Information

PRODUCT : SiB

	Product Physical Characteristics					
	Density (S.G.)	**Boiling Point (F,C) / pH**	**Sulfide** ppm	**Mercaptan** ppm	**Other** NaOH	**Other**
	1.301	10.78	58970ppm	23100ppm	4.73%	

STARTING VOLUME:

OTHER INFORMATION: 44940

PROCESSING INFORMATION

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PROCESSING NOTES:

54

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 08-26-08 **JOB Number (or other type of information):** 70924 (TRL 7253)

Customer, Product Description, Other Information

PRODUCT : SIB

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other
1.326	11.28	60290	9500 PPM	4.41	

OTHER INFORMATION: 43600 Lbs

STARTING VOLUME:

PROCESSING INFORMATION

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PROCESSING NOTES:

(53)

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 08-26-08 **JOB Number (or other type of information):** 70888 (TRL 239

Customer, Product Description, Other Information

PRODUCT : S1B (53)

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other
1.307	11.14	65270	0	4.36	

STARTING VOLUME: ____

OTHER INFORMATION: 49620 Lbs

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

52

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 8-25-08 **JOB Number (or other type of information):** 70404 TRL 7253 ~~70404~~

Customer, Product Description, Other Information

PRODUCT : S.I.B

	Product Physical Characteristics				
Density (S.G.)	**Boiling Point (F,C) / pH**	**Sulfide**	**Mercaptan**	**Other** NaOH	**Other**
1.25	11.55	3.208%	5.26%	5.002%	

OTHER INFORMATION:

46,280

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

51

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 08-22-08 JOB Number (or other type of information): 70403 (TRL 7253)

Customer, Product Description, Other Information

PRODUCT : SIB (51)

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other
1.242	10.40	0	55100	3.42%	

OTHER INFORMATION: 47040

STARTING VOLUME: ________

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

50

49

No sample

PRODUCT PROCESSING DATA REPORT

Date: 08-20-08 JOB Number (or other type of information): 70402

Customer, Product Description, Other Information

PRODUCT : SiB C7253

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other
1.3124	10.40	61210	—	6.698	

OTHER INFORMATION: 35800 LbS

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

49

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Load came in + Went out all in early hours of the morning.

Date: ______ JOB Number (or other type of information): ______

Customer, Product Description, Other Information

PRODUCT :

	Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other	

OTHER INFORMATION:

STARTING VOLUME: ______

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.
4904 Griggs Road
Houston, TX 77021
(713) 676-1676

SIB

Generator: KMCO

Doc. #: 70400 49

Trl #: 7253

Profile #: 2804 Date: 8-20-08

Product Processing Log Sheet, Edited, MASTER, 5-1-2008

GRP

EPAHO113001706

48

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

TRL

Date: 08-19-08 **JOB Number (or other type of information):** 70401 (7253)

Customer, Product Description, Other Information

PRODUCT : SIB 48

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other
1.357	10.78	73450	59630	7.844	

OTHER INFORMATION: 37900

STARTING VOLUME: ______

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

47

PRODUCT PROCESSING DATA REPORT

trailer: 7253

Date: 8-8-08 JOB Number (or other type of information): 69289

Customer, Product Description, Other Information

PRODUCT : SIB

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	~~Other~~ NaOH	Other
1.360	11.38	61830	13470	5.45%	

OTHER INFORMATION:
#'s 38560

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

7253

PRODUCT PROCESSING DATA REPORT

Date: 08-06-08 JOB Number (or other type of information): 69288 (46)

Customer, Product Description, Other Information

PRODUCT : SiB)

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other
1.356	11.21	63840	15600	5.3989	

OTHER INFORMATION: 49700 Lbs

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc. tl. 239

PRODUCT PROCESSING DATA REPORT

Date: 08-05-08 JOB Number (or other type of information): 69286 (45)

Customer, Product Description, Other Information

PRODUCT : SIB

	Product Physical Characteristics					
	Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH%	Other
	1.349	11.32	36580	51900	5.80	

OTHER INFORMATION: 33180 Lbs

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

44

PRODUCT PROCESSING DATA REPORT

Date: 08-02-08 JOB Number (or other type of information): 69276 (TRL 239)

Customer, Product Description, Other Information

PRODUCT : KMCO SIB

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other
1.3402	11.15	24440	53000	5.62	

OTHER INFORMATION: 39300

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

43

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 07/25/07 **JOB Number (or other type of information):** 68053

Customer, Product Description, Other Information

PRODUCT : SIB

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	NaOH Other	Other
1.3511	10.35	58640	89600	6.17	

STARTING VOLUME:

OTHER INFORMATION:
42620 Lbs

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

42

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 7-24-08 JOB Number (or other type of information): 68054 (239)

Customer, Product Description, Other Information

PRODUCT : SiB (42)

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other
1.348	11.05	26550	93 040	5.097	

STARTING VOLUME:

OTHER INFORMATION: 44000

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 07-23 JOB Number (or other type of information): 68055 (41)

Customer, Product Description, Other Information

PRODUCT : SIB (TRL 239

Product Physical Characteristics				
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other
1.354	11.74	23910	59610	4.25

OTHER INFORMATION: 46,280 P

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

40

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 7-18-08 JOB Number (or other type of information): 68052 (239)

Customer, Product Description, Other Information

PRODUCT : SIB

	Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	~~Other~~ NaOH	Other
Product Physical Characteristics						
	1.344	11.31	21880	34370	4.828	

OTHER INFORMATION: 33880

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

39

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 7-17- **JOB Number (or other type of information):** 68051- (TRL 2815)

Customer, Product Description, Other Information

PRODUCT : SIB

	Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other
1.3567	11.13	21710	37600	4.756	

OTHER INFORMATION: 41,040

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

38

CES Environmental Services, Inc.

(1264

PRODUCT PROCESSING DATA REPORT

Date: 7-16-08 JOB Number (or other type of information): 67649

Customer, Product Description, Other Information

PRODUCT : SIB

Product Physical Characteristics						
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaoH	Other
1.323	12.42	17770	75690	5.037	

OTHER INFORMATION: 35960

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

Product Processing Log Sheet, Edited, MASTER, 5-1-2008

GRP

EPAHO113001717

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

7-15-08

Date: ~~7-16-08~~ JOB Number (or other type of information): 67648 LT-423

Customer, Product Description, Other Information

PRODUCT: SIB 2804

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	~~Other~~ NAOH	Other
1.27	12.36	133,100	64,570	5.746%	

OTHER INFORMATION: 43,000

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

GRP

36

2815

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

7-14-08

Date: ~~7-15-08~~ JOB Number (or other type of information): 67647

Customer, Product Description, Other Information

PRODUCT: Si B 2804

	Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	~~Other~~ NaOH	Other
1.29	12.52	127,900	46930	5.255	

STARTING VOLUME:

OTHER INFORMATION:

~~NaOH 5.255~~ 41800 lb's

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

GRP

SIB

CES Environmental Services, Inc.

35

PRODUCT PROCESSING DATA REPORT

Date: 7-11-08 JOB Number (or other type of information): 239 7-11-08

Customer, Product Description, Other Information

PRODUCT: SIB

	Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	~~Other~~ NaOH	Other
			15,620	79,770	5.5848	

use .02 grams

STARTING VOLUME:

OTHER INFORMATION:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

R1 1.562 as H2S

R3 3.125 Mercap no H2S

R4 7.977 Mercaptan

Chris Campbell

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 7-10-08 JOB Number (or other type of information): 67657, LT-423

Customer, Product Description, Other Information

PRODUCT : SLB

	Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	~~Other~~ NaOH	Other
1.313	11.79	25,380	126,870	6.06	

OTHER INFORMATION:
37,240 #'s

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

2P15 33

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 7-10-08 JOB Number (or other type of information): 67644

Customer, Product Description, Other Information

PRODUCT: SIB 2804

~~.0169~~
~~.0173~~
.0267

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other Volt	Other
1.3114	10.80 ~~10.58~~	53520	67400	6.11	

Product Physical Characteristics

STARTING VOLUME:

OTHER INFORMATION:
36980 Pounds

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

1264

32

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: ~~7-10-08~~ 7-9-08 JOB Number (or other type of information): 67191

Customer, Product Description, Other Information

PRODUCT: SIB 2804

.01

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	~~Other~~ NaOH	Other
1.30	10.78	54,070	64,700	5.73%	

Product Physical Characteristics

OTHER INFORMATION:

36620 #lbs

109,240 ppm

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

31 ~~33~~

trailer 239

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 7-9-08 JOB Number (or other type of information): 67190

Customer, Product Description, Other Information

PRODUCT : STB

2804

	Product Physical Characteristics					
Density (S.G.)	**Boiling Point (F,C) / pH**	**Sulfide**	**Mercaptan**	~~**Other**~~ NH4OH	**Other**
1.28	10.09	51,070	~~102,140~~	5.160	

OTHER INFORMATION: 63,300

#'s 44,000

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

30

PRODUCT PROCESSING DATA REPORT

Date: 7-7-08 JOB Number (or other type of information): trailer 7253, 67189

2804

Customer, Product Description, Other Information

PRODUCT : SIB

	Product Physical Characteristics				
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other NaOH	Other
1.334	10.27	62720	83900	6.71	

STARTING VOLUME:

OTHER INFORMATION:
38,900 #'s

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

29

CES Environmental Services, Inc.

trailer 239

PRODUCT PROCESSING DATA REPORT

Date: 7-3-08 JOB Number (or other type of information): 67327

Customer, Product Description, Other Information

PRODUCT : SIB

trailer 239
profile 2804

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	~~Other~~ #s gal	Other
1.373	11.26	40,490	37,200	11.46	

STARTING VOLUME:

OTHER INFORMATION: #s 29,500 ; 2,574 gallons

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

Product Processing Log Sheet, Edited, MASTER, 5-1-2008

GRP

(28)

CES Environmental Services, Inc.

trl. 7253

PRODUCT PROCESSING DATA REPORT

Date: 7-3-08 JOB Number (or other type of information): 61787

2804

Customer, Product Description, Other Information

PRODUCT : SIB

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	~~Other~~ #'s gal	~~Other~~ oil %
1.38	11.15	40,770	0	11.52	0

OTHER INFORMATION:
45,240 ; 3,927 gallons

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

TRL 1264

CES Environmental Services, Inc.

(27) 1264 trailer

PRODUCT PROCESSING DATA REPORT

Date: ~~6-30-08~~ 6-28-08 JOB Number (or other type of information): 66750

Customer, Product Description, Other Information

PRODUCT : SIB

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	~~Other~~ #s gal
1.37	10.85	43,770	87,530	Ø 9.0:1	11.43

STARTING VOLUME:

OTHER INFORMATION:

44,480 Lb 3,892 gallons

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

NAOH % WT = 4.362°

TRL 239

CES Environmental Services, Inc.

26

PRODUCT PROCESSING DATA REPORT

Date: ~~6-30-08~~ 6-27-08 JOB Number (or other type of information): 68749 trailer 239

Customer, Product Description, Other Information

PRODUCT: SIB

	Product Physical Characteristics				
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	~~Other~~ #/gal
1.34	10.70	23,890	61,880	.5% oil	11.18

STARTING VOLUME:

OTHER INFORMATION:

43900 LB 3,927 gallons

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

NaOH % wt = 4.618

Product Processing Log Sheet, Edited, MASTER, 5-1-2008

GRP

EPAHO113001729

CES Environmental Services, Inc.

25

PRODUCT PROCESSING DATA REPORT

6-26-08

Date: ~~6-27-08~~ JOB Number (or other type of information): 66748, 2804, trailer 7253

Customer, Product Description, Other Information

PRODUCT : SIB

	Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other
1.39	11.05	23,710	64,040	4.47% NaOH	Ø% 0:1

STARTING VOLUME: 47900 #'s

OTHER INFORMATION:
#'s gal 11.60 4,129 gal

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

24

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 6-21 JOB Number (or other type of information): 66243, trl. 7253

Customer, Product Description, Other Information

PRODUCT : S1B

	Product Physical Characteristics					
	Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	#'s ~~Other~~ gal	0:1 ~~Other~~
	1.297	10.93	8,330 ppm	113,490 ppm	10.85	Ø%

OTHER INFORMATION: 27,240 #'s 2,511 gal

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 6-20-08 JOB Number (or other type of information): 66242, trl. 2815

Customer, Product Description, Other Information

PRODUCT : SIB

	Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	~~Other~~ #S/gal	~~Other~~ Oil	
1.299	10.81	11,700 ppm	106,480 ppm	10.85	~~0~~	

OTHER INFORMATION: 38,960 $\frac{\#}{1}$ S 3,591 gal

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

/

22

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: ~~6-20-08~~ 6-19-08 JOB Number (or other type of information): 66241, trl. 1264

Customer, Product Description, Other Information

PRODUCT : S1B

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	#'s ~~Other~~ ~~gal~~	Oil ~~Other~~
1.243	10.16	~~7970~~ ppm	~~13 2400~~ ppm	10.35	~~0~~

.015gm
9.954ml

STARTING VOLUME:

OTHER INFORMATION: #'s 35,~~780 gal~~ ~~10220~~ ppm 55,110 ppm 61,000 53,040 64,200

3,457 gal

-~~703~~.7	.811	-122.0	2.268
-~~431~~.8	1.345	-72.3	4.354
-~~282~~.5	1.645 ml	-36	9.954

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

CES Environmental Services, Inc.

21

PRODUCT PROCESSING DATA REPORT

6-18-08

Date: ~~6-19-08~~ JOB Number (or other type of information): KMCO 66240 2804

Customer, Product Description, Other Information LT423

PRODUCT: SiB

	Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	~~Other~~ #5/gal	~~Other~~ % Oil	
1.34	10.2	60,730	76,800	11.18	.5%	

STARTING VOLUME:

OTHER INFORMATION:

36,680 3,281 gal

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

20

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 6-12-08 JOB Number (or other type of information): SIB, 65859, trl. 239

Customer, Product Description, Other Information

PRODUCT : SIB

2804

Density (S.G.)	Boiling Point (F,C)/ pH	Sulfide	Mercaptan	#s/gal ~~Other~~	0.1 ~~Other~~
~~1.396~~ 1.355	11.42	9940 ppm	69510 ppm	11.35	~~0~~

Product Physical Characteristics

OTHER INFORMATION:
31,800 pounds ~~gallons~~
2,802 gallons
9,940 S
69,510 Merc.
~~14,620~~
~~123,020~~

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

19

BOL

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 6-10-08 JOB Number (or other type of information): 65069 KMCO

Customer, Product Description, Other Information TRL 224

PRODUCT: SIB

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	#s gal ~~Other~~	Oil ~~Other~~
1.37089	11.76	18,630 ppm	92,160 ppm	11.43	NO

OTHER INFORMATION:
43,540 ~~gal~~. #'s Gal = 3,809

STARTING VOLUME: ______

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

(18)

004018372

PRODUCT PROCESSING DATA REPORT

Date: 6-5-08 JOB Number (or other type of information): 65068, t/l. 1249

Customer, Product Description, Other Information

PRODUCT : SIB

	Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	#'s ~~Other~~ gal	Oil Other	
1.38	11.54	19,130	86,130	11.52	droplets in top	

STARTING VOLUME:

OTHER INFORMATION:
46,520 #'s Gal = 4,038

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

17

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

6-4-08

Date: ~~6-5-08~~ JOB Number (or other type of information): 65067, trailer 2815

.03gm

Customer, Product Description, Other Information

PRODUCT: SIB

	Product Physical Characteristics				
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	#/gal ~~Other~~	gal Other
1.359	11.29	36050 ppm	38000 ppm	11.34	3480

OTHER INFORMATION:

39,460 No Oil

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

16

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

224

Date: 6-~~4~~3-08 JOB Number (or other type of information): 65066, 6-3-08

Customer, Product Description, Other Information

PRODUCT: SIB

	Product Physical Characteristics				
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	#8/31 Other	Other
1.3528	10.96	12,750 ppm	74,280 ppm	11.26	

OTHER INFORMATION:
38,440 W: Oil 3,414 gal

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

Trailer 239 15

PRODUCT PROCESSING DATA REPORT

Date: 6-3-08 JOB Number (or other type of information): 65065, 6-2-08

Customer, Product Description, Other Information

PRODUCT: SLB

2696

	Product Physical Characteristics				
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	#'s/gal Other	Other
1.3310	11.36	9510 ppm	85860 ppm	11.10	

OTHER INFORMATION:
44,500 4,009 gal

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

14

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 5-30 JOB Number (or other type of information): 224

Customer, Product Description, Other Information

PRODUCT : SIB

STARTING VOLUME:

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other
1.25	12.45	29,660	33,900		

OTHER INFORMATION:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

roduct Processing Log Sheet, Edited, MASTER, 5-1-2008

GRP

EPAHO113001741

CES Environmental Services, Inc.

(13)

PRODUCT PROCESSING DATA REPORT

423

Date: 5-29-08 JOB Number (or other type of information):

Customer, Product Description, Other Information

PRODUCT : SIB

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other
1.28	11.58	31,100	46,600		

OTHER INFORMATION:

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

(12)

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

00401 8229 JJK

Date: 5-29-08 JOB Number (or other type of information): 65037 2815

38,

Customer, Product Description, Other Information

PRODUCT : SIB

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other
1.30	11.55	11,990	97,550		

OTHER INFORMATION:

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

CES Environmental Services, Inc.

(11)

PRODUCT PROCESSING DATA REPORT

Date: 5-28-08 JOB Number (or other type of information): 64880

Customer, Product Description, Other Information TRL 1264

PRODUCT : S1B

	Product Physical Characteristics				
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other
1.248	11.18	38090 ppm	52000 ppm		

OTHER INFORMATION:

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

Saturday

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CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 5-24-08 JOB Number (or other type of information): 2815

Customer, Product Description, Other Information

PRODUCT :

	Product Physical Characteristics					
	Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other

OTHER INFORMATION:

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

(9)

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 5-23 **JOB Number (or other type of information):** trailer 1264, Job # 64490

Customer, Product Description, Other Information

PRODUCT : SIB

.03 gm

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other
1.25372		41,420	49,400 ppm		

Product Physical Characteristics

OTHER INFORMATION: ppm

#1

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

Product Processing Log Sheet, Edited, MASTER, 5-1-2008

GRP

EPAHO113001746

CES Environmental Services, Inc.

(8) Trailer 224

PRODUCT PROCESSING DATA REPORT

Date: 5-22-08 JOB Number (or other type of information): 64489 004016460 JJK

Customer, Product Description, Other Information 6% Oil

PRODUCT: SIB

.03 gm
0.03403

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other
1.3659		23360	62,080		

OTHER INFORMATION:

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

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PROCESSING NOTES:

(7)

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 5-21-08 JOB Number (or other type of information): 64476 SLB trailer 239

Customer, Product Description, Other Information

PRODUCT : SLB

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other
1.36934		21060 ppm	79 030 ppm		

OTHER INFORMATION:

STARTING VOLUME:

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

(6)

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 5-19-08 **JOB Number (or other type of information):** 63936, Trailer LT 423

Customer, Product Description, Other Information

PRODUCT : S1B

	Product Physical Characteristics				
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	#'s/gallon ~~Other~~	Gallons ~~Other~~
1.33961	12.31	[illegible]	59,410	11.18	3,628
1.34	OTHER INFORMATION: oil = 1% #'s = 40,560				

STARTING VOLUME: ______

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
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PROCESSING NOTES:

Product Processing Log Sheet, Edited, MASTER, 5-1-2008 GRP

EPAHO113001749

CES Environmental Services, Inc.

5

PRODUCT PROCESSING DATA REPORT

Date: 5-17-08 SAT JOB Number (or other type of information): Trailer 2815 Sampled

Customer, Product Description, Other Information 63935

PRODUCT : SLB

wt. = .0352

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	#'s/gal ~~Other~~	~~Other~~ Gallons
1.32392	10.95	17,360	[illegible]	11.02	[illegible]

1.32

STARTING VOLUME:

OTHER INFORMATION:
Oil = 1%
#'s = 39,920

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
		1,449 gal	1
		725 gal	2
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		217 gallons	6
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PROCESSING NOTES: 10-118F ; 20-128F ; 30-142F
40% Aeromide 80ml's 40-150°F ; 50-164 ;
60 175F ; 70 182F ; 160 ; 178F
20% Water 40ml's 170 then pH = 9.0

ACID 160F
5ml - 174F pH - 8.5
10ml 182F pH - 8.0
12ml pH = 4.5
S = 0
6%
ASH - 0
Solids = 14%

GRP

Product Processing Log Sheet, Edited, MASTER, 5-1-2008

EPAHO113001750

SIB Hazardous Wastewater TREATMENT PROCESSING

5-22-2008

CONTAINER 2815

BATCH SPECIFIC PROCESSING INFORMATION:

SPECIAL PROCESS TO A PH OF 4.5 ONLY

Job Number: 63935

Manifest Number: 004016321 JJK

Trailer Number: 2815

Gallons: 3,623 gallons ; 39,920 pounds ALL TREATMENT VOLUMES BASED ON THIS QUANTITY

pH= 10.95, density = 1.32,Sulfide= 17,360, Mercapatan = 72,100 Oil= 2%

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

N/A: THE OIL LAYER MUST BE SEPARATED & REMOVED FROM THE MATERIAL FOR THE PROCESSING OF THIS CONTAINER (LEAVE THE TOP OIL IN THE TRAILER). IF NOT REMOVED THE OIL WILL REMAIN AS AN OIL THROUGHOUT THE ENITRE TREATMENT AND BE A TOP OIL ORGANIC LAYER AFTER TREATMENT. THIS WILL CAUSE PROBLEMS.

***REVISED TREATMENT PROCESSING:* TARGET PH OF 4.5, It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.**

N/A :For the pH target the pH is 1.8 (range 1.6 -1.9). MAKE SURE THE TARGET PH IS MET, THIS IS A CRITICAL PART OF TREATMENT. It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.

PLEASE FOLLOW ALL TREATMENT AND PROCESSING PRECAUTIONS PREVIOUSLY ESTABLISHED FOR THE REACTIONS INVOLVED IN THE TREATMENT AND HANDLING OF THIS MATERIAL.

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK.

NOTE: ALL GALLON VOLUMES ARE BASED ON A PERCENTAGE BY TREATMENT. THE VOLUMES IN THE TANK MAY NOT BE EXACT. BECAUSE OF THIS WHEN AROUND 65% OF THE REQUIRED STATED TREATMENT VOLUMES LISTED BELOW ARE REACHED START ADDING THE TREATMENT CHEMICALS SLOWLY AND BY SMALL ADDITIONAL VOLUMES. THIS IS VERY IMPORTANT TO TREAT THE SIB MATERIAL CORRECTLY AND PRODUCE A QUALITY TREATED WATER.

1. ***PEROXIDE & WATER ADDITION*** : *1,449 gallons (40% BY VOLUME)* of 10% CONCENTRATION hydrogen peroxide; 725 gallons of water *(20% BY VOLUME)* (TOTAL peroxide & water equal approximately 60% of the received volume of SIB). **During this part of the treatment process the temperature can reach as high as 180 degrees F, *ADD WITH CAUTION; THE PEROXIDE REACTION CAN BE VERY VIOLENT IF ADDED TO FAST, REDUCE GPM TO 3 GPM OR LOWER IF NECESSARY.*** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ***ACID ADDITION*** *:* (NOTE: TO PROCESS TO A PH OF 4.5 THE REQUIRED GALLONS ARE 277) ***pH TARGET = 4.5*** ADD Approximately 217 GALLONS (approximately, 6 % of the received volume of SIB) OF SULFURIC ACID. ***The gallon volume required is not an exact volume.*** As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS). HEAVY SOLIDS START FORMING AROUND A PH OF 9 & CONTINUE TO FORM UNTIL A PH OF AROUND 4.5 IS REACHED. ACID ADDITION at a slow gpm & WELL MIXING IN THE TANK IS CRITICAL AND VERY IMPORTANT AT THIS STAGE OF TREATMENT. ***The sulfides at the target pH (4.5) will be driven off to the scrubber; this may just take a little more mixing & process scrubbing time.*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 4.5 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). **ONCE THE CORRECT PH HAS BEEN MET LET THE TANK MIX AND DIGEST THE ORGANICS PRESENT FOR AT LEAST 2 HOURS TO MAKE SURE THE FINAL COLOR IS LIGHT**. Catch a sample from the tank to verify this. If necessary you can quickly add some 50% caustic in a beaker & bring the pH up to about a 9 to see what the final color will be like. Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. **N/A ;** ADD Approximately 40 GALLONS OF FERRIC CHLORIDE, THIS BATCH TAKES A LOT MORE FERRIC CHLORIDE THEN PAST BATCHES **, DO NOT ADD SO MUCH FERRIC CL SO THE MATERIAL TURNS BLACK.** YOU DO NOT NEED THIS MUCH FERRIC. ADD A COUPLE OF GALLONS AND THEN CHECK THE TANK. THEN ADD SLOWLY. 1/2 GALLON AT A TIME FROM THEN ON. Ferric Chloride addition. Add a total volume of ferric chloride to be **1 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. **N/A ;** **SODIUM HYDROXIDE ADDITION (50% CONCENTRATION) ALWAYS ADD THE CAUSTIC IN INCREMENTS, OF THE TOTAL CAUSTIC ESTIMATED ONLY ADD 40% FOR THE FIRST ADDITION, THEN ADD IN 10% ADDITIONS WORKING DOWN TO 1% BY VOLUME OF THE CALCUATED CAUSTIC VOLUME, THE PH CHANGES VERY FAST to a HIGH PH FROM THE 7.0 PH MARK.:** ADD Approximately 205 GALLONS OF SODIUM HYDROXIDE caustic, TARGET PH IS 9.0 (approximately, 5.55 % of the received volume of SIB), gradually add the caustic and check the pH and color until you reach the target pH. **The gallon volume of caustic required is not an exact volume. As you near the pH target point stop the caustic addition and let the tank mix for 20-30 minutes or more & check the pH. If more caustic is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.** Proceed to step 5.

5. **N/A ;** ADD 48 GALLONS OF POLYMER (approximately, 1.3 % of the received volume of SIB). ADD SLOWLY. Proceed to step 6.

6. **N/A ;** Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. **N/A ;** With all of the processing steps completed catch a sample from the mixing vessel. Test for pH, sulfides, mercaptans, TOC and metals (THE QUICK ammonia TEST shows high ppm of ammonia, the waste stream only has about 28 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

The Solids in treatment to a pH of 4.5 with this batch is 14 % not back calculated to the original volume.

0.03g

CES Environmental Services, Inc.

Trailer 1264

4

PRODUCT PROCESSING DATA REPORT

Date: 5-15-08 JOB Number (or other type of information): SIB 1264

004016255 JJK Customer, Product Description, Other Information Job# 63934

PRODUCT : SIB

	Product Physical Characteristics				
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	~~Other~~ #'s/gal	Other Gallons
1.36277	12.68	16,640 ppm	67,010 ppm	11.35	3,697

OTHER INFORMATION: Oil = 2%

41,960 #'s

STARTING VOLUME: 200

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
			1
	1,479 gal	40%	2
	739 gal	20%	3
			4
		2776 gal	5
			6
			7
	499 gal	13.5%	8
			9
			10
			11
			12
	40 gal	1%	13
			14
			15
	205 gal		16
			17
			18
			19
	48 gal		20
			21

PROCESSING NOTES:

20ml - 112F 40ml - 137

H_2O_2 40% 80ml 50 - 147F 60 - 158F 70 - 166 174°F

H_2O 20% 40ml 110°F

ACID ~~10ml~~ 134 pH = 9

15ml pH - 4

15 7.5% 4.5 pH

~~18ml~~ 17ml pH = 3 orangy creamy

~~19ml~~ pH = 3

20ml pH = 2.58

21ml pH = 2.33

27ml 23ml pH = 2.13

13.5% acid 25ml pH = 2.01

26ml pH = 2.05

27ml pH = 1.83 liquid is orangish creamy

Let the mixture agitate

1% Ferric Chloride 2ml

Caustic ~~6ml~~ pH = 3

5.55% 8ml pH = 5.5

9ml pH 6.5

10ml pH 7.0

10.5ml pH ~~8.0~~ 7.5

11.0ml pH = 7.90

11.1ml pH = 8.58

1.3% Poly 2.6ml

18% solids

GRP

EPAHO113001755

SIB Hazardous Wastewater TREATMENT PROCESSING

5-20-2008

CONTAINER 1264

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 63934

Manifest Number: 004016255 JJK

Trailer Number: 1264

Gallons: 3,697 gallons ; 41,960 pounds ALL TREATMENT VOLUMES BASED ON THIS QUANTITY

pH= 12.68, density = 1.36,Sulfide= 16,640, Mercapatan = 67,010 Oil= 2%

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

N/A: THE OIL LAYER MUST BE SEPARATED & REMOVED FROM THE MATERIAL FOR THE PROCESSING OF THIS CONTAINER (LEAVE THE TOP OIL IN THE TRAILER). IF NOT REMOVED THE OIL WILL REMAIN AS AN OIL THROUGHOUT THE ENITRE TREATMENT AND BE A TOP OIL ORGANIC LAYER AFTER TREATMENT. THIS WILL CAUSE PROBLEMS.

For the pH target the pH is 1.8 (range 1.6 -1.9). MAKE SURE THE TARGET PH IS MET, THIS IS A CRITICAL PART OF TREATMENT. It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.

PLEASE FOLLOW ALL TREATMENT AND PROCESSING PRECAUTIONS PREVIOUSLY ESTABLISHED FOR THE REACTIONS INVOLVED IN THE TREATMENT AND HANDLING OF THIS MATERIAL.

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK.

NOTE: ALL GALLON VOLUMES ARE BASED ON A PERCENTAGE BY TREATMENT. THE VOLUMES IN THE TANK MAY NOT BE EXACT. BECAUSE OF THIS WHEN AROUND 65% OF THE REQUIRED STATED TREATMENT VOLUMES LISTED BELOW ARE REACHED START ADDING THE TREATMENT CHEMICALS SLOWLY AND BY SMALL ADDITIONAL VOLUMES. THIS IS VERY IMPORTANT TO TREAT THE SIB MATERIAL CORRECTLY AND PRODUCE A QUALITY TREATED WATER.

1. ***PEROXIDE & WATER ADDITION*** : *1,479 gallons (40% BY VOLUME)* of 10% CONCENTRATION hydrogen peroxide; 739 gallons of water *(20% BY VOLUME)* (TOTAL peroxide & water equal approximately 60% of the received volume of SIB). **During this part of the treatment process the temperature can reach as high as 180 degrees F, *ADD WITH CAUTION; THE PEROXIDE REACTION CAN BE VERY VIOLENT IF ADDED TO FAST, REDUCE GPM TO 3 GPM OR LOWER IF NECESSARY.*** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ***ACID ADDITION*** : (NOTE: TO PROCESS TO A PH OF 4.5 THE REQUIRED GALLONS ARE 277) ***pH TARGET = 1.8*** ADD Approximately 499 GALLONS (approximately, 13.25 % of the received volume of SIB) OF SULFURIC ACID. *The gallon volume required is not an exact volume.* As you near the pH target point stop acid

addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. **ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS).** HEAVY SOLIDS START FORMING AROUND A PH OF 9 & CONTINUE TO FORM UNTIL A PH OF AROUND 4 IS REACHED. ACID ADDITION at a slow gpm & WELL MIXING IN THE TANK IS CRITICAL AND VERY IMPORTANT AT THIS STAGE OF TREATMENT. **The acid treatment pH target point is a pH of 1.8 su (RANGE 1.6 – 1.9).** ***The sulfides at the target pH (1.8) will be driven off to the scrubber; this may just take a little more mixing & process scrubbing time.*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 1.9 pH, 1.6 – 2.0 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). **ONCE THE CORRECT PH HAS BEEN MET LET THE TANK MIX AND DIGEST THE ORGANICS PRESENT FOR AT LEAST 2 HOURS TO MAKE SURE THE FINAL COLOR IS LIGHT.** Catch a sample from the tank to verify this. If necessary you can quickly add some 50% caustic in a beaker & bring the pH up to about a 9 to see what the final color will be like. Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. ADD Approximately 40 GALLONS OF FERRIC CHLORIDE, THIS BATCH TAKES A LOT MORE FERRIC CHLORIDE THEN PAST BATCHES **, DO NOT ADD SO MUCH FERRIC CL SO THE MATERIAL TURNS BLACK. YOU DO NOT NEED THIS MUCH FERRIC. ADD A COUPLE OF GALLONS AND THEN CHECK THE TANK. THEN ADD SLOWLY, 1/2 GALLON AT A TIME FROM THEN ON.** **Ferric Chloride** addition. Add a total volume of ferric chloride to be **1 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. **SODIUM HYDROXIDE ADDITION (50% CONCENTRATION) ALWAYS ADD THE CAUSTIC IN INCREMENTS, OF THE TOTAL CAUSTIC ESTIMATED ONLY ADD 40% FOR THE FIRST ADDITION, THEN ADD IN 10% ADDITIONS WORKING DOWN TO 1% BY VOLUME OF THE CALCUATED CAUSTIC VOLUME, THE PH CHANGES VERY FAST to a HIGH PH FROM THE 7.0 PH MARK.:** ADD Approximately 205 GALLONS OF SODIUM HYDROXIDE caustic, TARGET PH IS 9.0 (approximately, 5.55 % of the received volume of SIB), gradually add the caustic and check the pH and color until you reach the target pH. **The gallon volume of caustic required is not an exact volume. As you near the pH target point stop the caustic addition and let the tank mix for 20-30 minutes or more & check the pH. If more caustic is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.** Proceed to step 5.

5. ADD 48 GALLONS OF POLYMER (approximately, 1.3 % of the received volume of SIB). ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Test for pH, sulfides, mercaptans, TOC and metals (THE QUICK ammonia TEST shows high ppm of ammonia, the waste stream only has about 28 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

The Solids FORMED WITH USING CAUSTIC (SODIUM HYDROXIDE) with this batch is 18 % not back calculated to the original volume.

Gary Peterson

From: Gary Peterson
Sent: Monday, May 19, 2008 8:41 AM
To: Matt Bowman; Marlin Moser
Subject: Sulfide & Mercaptan levels of SIB Loads, 5-20-08
Attachments: 5 SIB STATUS Load Receipt and Processing Data Sheet, 5-20-2008.xls

The sulfide and mercaptan levels of the last 5 loads of received SIB are as follows:

SIB Load Sulfide & Mercaptan Levels			
DATE	TRAILER	SULFIDE (ppm)	Mercaptan (ppm)
5-12-08	LT-423	28,360	96,970
5-13-08	239	1,817	64,960
5-14-08	224	9,410	51,500
5-15-08	1264	16,640	67,010
5-16-08	2815	17,360	72,100

Also attached is the SIB receipt and Processing data sheet.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

CES Environmental Services, Inc.

7-1/2008 STATUS, Update

PROFILE NO. 2696, 2804

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	POUNDS	GALLONS	SAMPLED/ NOTES	STATUS
1	5/12/08	004016129 JJK	LT-423	63931	41,660		Yes/2% Oil	Processed, 5-17-2008
2	5/13/08	004016129 JJK	239	63932	41,060		Yes/2% Oil	Processed, 5-15-2008
3	5/14/08	004016235 JJK	224	63933	41,670		Yes/2% Oil	Processed, 5-20-2008
4	5/15/08	004016255 JJK	1264	63934	41,960		Yes/2% Oil	Processed, 5-22-2008
5	5/16/08	004016321 JJK	2815	63935	39,920		Yes/1% Oil	
6	05/17/08	004016351 JJK	LT-423	63936	40,560		Yes/1% Oil	
7	05/20/08	004016422 JJK	239	64476	46,320		Yes/small spot's of Oil	
8	05/21/08	004016460 JJK	224	64489	39,600		Yes/ 6% Oil	
9	05/22/08	004016497 JJK	1264	64490	40,920		Yes/ 3.5% Oil	
10	05/24/08	004018065 JJK	2815	64887	Not on Manifest		NO	
11	05/28/08	004018193 JJK	1264	64880	39,640		YES/ 0% Oil	
12	05/29/08	004018229 JJK	2815	65037	38,700		YES/ 0% Oil	

EPAHO113001762

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST/ BOL NUMBER	TRAILER NUMBER	JOB NUMBER	POUNDS	GALLONS	SAMPLED/ NOTES	STATUS
13	05/29/08	004018231 JJK	423	64881	44,820		YES/ 0% Oil	
14	05/30/08	003309533JJK	224	65064	39,920		YES/ **10 % Oil**	
15	06/02/08	004018279 JJK	239	65065	44,500	4,009	YES/ 0% Oil	
16	06/03/08	004018306 JJK	224	65066	38,440	3,414	YES/ 0% Oil	
17	06/04/08	003319537 JJK	2815	65067 (BOL #)	39,460	3,480	YES/ 0% Oil	
18	06/05/08	004018372 JJK	1264	65068	46,520	4,038	Yes/ very few small spots of Oil	
19	06/06/08	65069	224	65069	43,540	3,809	YES/ .5 % Oil	
20	06/12/08	65859	239	65859	31,800	2,802	YES/ 0% Oil	
21	06/18/08	66240	LT-423	66240	36,680	3,281	YES/ 0% Oil	
22	06/19/08	66241	1264	66241	35,780	3,457	YES/ 0% Oil	
23	06/20/08	66242	2815	66242	38,960	3,591	YES/ 0% Oil	
24	06/21/08	66243	7253	66243	27,240	2,511	YES/ 0% Oil	
25	06/26/08	66748	7253	66748	47,900	4,129	YES/ 0% Oil	

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST/ BOL NUMBER	TRAILER NUMBER	JOB NUMBER	POUNDS	GALLONS	SAMPLED/ NOTES	STATUS
26	06/27/08	66749	239	66749	43900	3,927	YES/ 0% Oil	
27	06/28/08	66750	1264	66750	44480	3,892	YES/ 0% Oil	
28								
29								
30								
31								
32								
33								
34								
35								
36								

SIB RECEIPT & PROCESSING DATA SHEET

CES Environmental Services, Inc.

6/23/2008 STATUS, Update

PROFILE NO. 2696, 2804

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	POUNDS	GALLONS	SAMPLED/ NOTES	STATUS
1	5/12/08	004016129 JJK	LT-423	63931	41,660		Yes/2% Oil	Processed, 5-17-2008
2	5/13/08	004016129 JJK	239	63932	41,060		Yes/2% Oil	Processed, 5-15-2008
3	5/14/08	004016235 JJK	224	63933	41,670		Yes/2% Oil	Processed, 5-20-2008
4	5/15/08	004016255 JJK	1264	63934	41,960		Yes/2% Oil	Processed, 5-22-2008
5	5/16/08	004016321 JJK	2815	63935	39,920		Yes/1% Oil	
6	05/17/08	004016351 JJK	LT-423	63936	40,560		Yes/1% Oil	
7	05/20/08	004016422 JJK	239	64476	46,320		Yes/small spot's of Oil	
8	05/21/08	004016460 JJK	224	64489	39,600		Yes/ 6% Oil	
9	05/22/08	004016497 JJK	1264	64490	40,920		Yes/ 3.5% Oil	
10	05/24/08	004018065 JJK	2815	64887	Not on Manifest		NO	
11	05/28/08	004018193 JJK	1264	64880	39,640		YES/ 0% Oil	
12	05/29/08	004018229 JJK	2815	65037	38,700		YES/ 0% Oil	

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	POUNDS	GALLONS	SAMPLED/ NOTES	STATUS
13	05/29/08	004018231 JJK	423	64881	44,820		YES/ 0% Oil	
14	05/30/08	003309533JJK	224	65064	39,920		YES/ **10 % Oil**	
15	06/02/08	004018279 JJK	239	65065	44,500	4,009	YES/ 0% Oil	
16	06/03/08	004018306 JJK	224	65066	38,440	3,414	YES/ 0% Oil	
17	06/04/08	003319537 JJK	2815	65067 (BOL #)	39,460	3,480	YES/ 0% Oil	
18	06/05/08	004018372 JJK	1264	65068	46,520	4,038	Yes/ very few small spots of Oil	
19	06/06/08	65069	224	65069	43,540	3,809	YES/ .5 % Oil	
20	06/12/08	65859	239	65859	31,800	2,802	YES/ 0% Oil	
21	06/18/08	66240	LT-423	66240	36,680	3,281	YES/ 0% Oil	
22	06/19/08	66241	1264	66241	35,780	3,457	YES/ 0% Oil	
23	06/20/08	66242	2815	66242	38,960	3,591	YES/ 0% Oil	
24	06/21/08	66243	7253	66243	27,240	2,511	YES/ 0% Oil	

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	POUNDS	GALLONS	SAMPLED/ NOTES	STATUS
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	POUNDS	GALLONS	SAMPLED/ NOTES	STATUS
36								
37								

CES Environmental Services, Inc.

6/5/2008 STATUS, Update

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
1	5/12/08	004016129 JJK	LT-423	63931	41,660	Yes/2% Oil	Processed, 5-17-2008
2	5/13/08	004016129 JJK	239	63932	41,060	Yes/2% Oil	Processed, 5-15-2008
3	5/14/08	004016235 JJK	224	63933	41,670	Yes/2% Oil	Processed, 5-20-2008
4	5/15/08	004016255 JJK	1264	63934	41,960	Yes/2% Oil	Processed, 5-22-2008
5	5/16/08	004016321 JJK	2815	63935	39,920	Yes/1% Oil	
6	05/17/08	004016351 JJK	LT-423	63936	40,560	Yes/1% Oil	
7	05/20/08	004016422 JJK	239	64476	46,320	Yes/small spot Oil	
8	05/21/08	004016460 JJK	224	64489	39,600	Yes/ 6% Oil	
9	05/22/08	004016497 JJK	1264	64490	40,920	Yes/ 3.5% Oil	
10	05/24/08	004018065 JJK	2815	64887	Not on Manifest	NO	
11	05/28/08	004018193 JJK	1264	64880	39,640	YES/ 0% Oil	
12	05/29/08	004018229 JJK	2815	65037	38,700	YES/ 0% Oil	

EPAHO113001769

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
13	05/29/08	004018231 JJK	423	64881	44,820	YES/ 0% Oil	
14	05/30/08	003309533JJK	224	65064	39,920	YES/ **10 % Oil**	
15	06/02/08	004018279 JJK	239	65065	44,500	YES/ 0% Oil	
16	06/03/08	004018306 JJK	224	65066	38,440	YES/ 0% Oil	
17	06/04/08	003319537 JJK	~~239~~ 2815	65067 (BOL #)	39,460	YES/ 0% Oil	
18	6-5	004018372JJK	1264	65068	46,520	Yes/ Spots of oil on top	
19	6-6	65069	224	65069	43,540	Yes/Ø% Oil	
20	6-12	65859	239	65859	31,800	Yes/Ø% Oil	
21	6-18	66240	LT-423	66240	36,680	Yes/ Ø% Oil	
22	6-19	66241	1264	66241	35,780	Yes/ Ø Oil	
23	6-20	66242	2815	66242	38,960	Yes/ Ø%	
24	6-21	66243	7253	66243	27,240	Yes/ Ø	

CES Environmental Services, Inc.

5/29/2008 STATUS, Update

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
1	5/12/08	004016129 JJK	LT-423	63931	41,660	Yes/2% Oil	Processed, 5-17-2008
2	5/13/08	004016129 JJK	239	63932	41,060	Yes/2% Oil	Processed, 5-15-2008
3	5/14/08	004016235 JJK	224	63933	41,670	Yes/2% Oil	Processed, 5-20-2008
4	5/15/08	004016255 JJK	1264	63934	41,960	Yes/2% Oil	Processed, 5-22-2008
5	5/16/08	004016321 JJK	2815	63935	39,920	Yes/1% Oil	
6	05/17/08	004016351 JJK	LT-423	63936	40,560	Yes/1% Oil	
7	05/20/08	004016422 JJK	239	64476	46,320	Yes/small spot Oil	
8	05/21/08	004016460 JJK	224	64489	39,600	Yes/ 6% Oil	
9	05/22/08	004016497 JJK	1264	64490	40,920	Yes/ 3.5% Oil	
10	05/24/08	004018065 JJK	2815	64887	Not on Manifest	NO	
11	05/28/08	004018193 JJK	1264	64880	39,640	YES/ 0% Oil	
12	05/29/08	004018229 JJK	2815	65037	38,700	~~NO~~ Yes/0% Oil	

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
13	05/29/08	004018231 JJK	423	64881	44,820	YES/ 0% Oil	
14	05/30/08	003309533JJK	224	65064	39,920	YES/ **10 % Oil**	
15	06/02/08	004018279 JJK	239	65065	44,500	YES/ 0% Oil	
16	6.3.08						
17	6-4						
18							
19							
20							
21							
22							
23							
24							

CES Environmental Services, Inc.

5/29/2008 STATUS, Update

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
1	5/12/08	004016129 JJK	LT-423	63931	41,660	Yes/2% Oil	Processed, 5-17-2008
2	5/13/08	004016129 JJK	239	63932	41,060	Yes/2% Oil	Processed, 5-15-2008
3	5/14/08	004016235 JJK	224	63933	41,670	Yes/2% Oil	Processed, 5-20-2008
4	5/15/08	004016255 JJK	1264	63934	41,960	Yes/2% Oil	Processed, 5-22-2008
5	5/16/08	004016321 JJK	2815	63935	39,920	Yes/1% Oil	
6	05/17/08	004016351 JJK	LT-423	63936	40,560	Yes/1% Oil	
7	05/20/08	004016422 JJK	239	64476	46,320	Yes/small spot Oil	
8	05/21/08	004016460 JJK	224	64489	39,600	Yes/ 6% Oil	
9	05/22/08	004016497 JJK	1264	64490	40,920	Yes/ 3.5% Oil	
10	05/24/08	004018065 JJK	2815	64887	? Not on manifest	NO	
11	05/28/08	004018193 JJK	1264	64880	39,640	YES/ 0% Oil	
12	05/29/08	004018229 JJK	2815	65037	38,700	~~NO~~ Yes/ Ø	
13	5-29	004018231 JJK	423	64881	44,820	yes / Ø	
14	5-30	003319533 JJK	224	65064	39,920	yes ~~Ø~~ 10%	
15	6-2	004018279 JJK	239	65065	44,500	yes Ø	

EPAHO113001773

CES Environmental Services, Inc.

5/22/2008 STATUS, Update

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
1	5/12/08	004016129 JJK	LT-423	63931	41,660	Yes/2% Oil	DONE, 5-17-2008
2	5/13/08	004016129 JJK	239	63932	41,060	Yes/2% Oil	DONE 5-15-2008
3	5/14/08	004016235 JJK	224	63933	41,670	Yes/2% Oil	DONE 5-20-2008
4	5/15/08	004016255 JJK	1264	63934	41,960	Yes/2% Oil	Processing 5-22-08
5	5/16/08	004016321 JJK	2815	63935	39,920	Yes/1% Oil	on the line
6	05/17/08	004016351 JJK	LT-423	63936	40,560	Yes/1% Oil	on the line
7	05/20/08	004016422 JJK	239	64476	46,320	Yes/small spot Oil	on the line
8	05/21/08	004016460 JJK	224	64489	39,600	Yes/ 6% Oil	on the line
9	05/22/08	004016497 JJK	1264	64490	40,920	Yes/~~NO~~ 3.5% Oil	~~not received yet~~
10	5-24-08		2815				Not Sampled
11	5-28-08	004018193 JJK	1264	64880	39,640	Yes/0% Oil	
12	5-29-08	004018229 JJK	2815	65037	38,700	No	

CES Environmental Services, Inc.

~~20/2008~~ STATUS, Update, ~~2nd~~
5-21-08

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
1	5/12/08	004016129 JJK	LT-423	63931	41,660	Yes/2% Oil	DONE, 5-17-2008
2	5/13/08	004016129 JJK	239	63932	41,060	Yes/2% Oil	DONE 5-15-2008
3	5/14/08	004016235 JJK	224	63933	41,670	Yes/2% Oil	DONE 5-20-2008
4	5/15/08	004016255 JJK	1264	63934	41,960	Yes/2% Oil	NEXT 5-21-08
5	5/16/08	004016321 JJK	2815	63935	39,920	Yes/1% Oil	on the line
6	05/17/08	004016351 JJK	LT-423	63936	40,560	Yes/1% Oil	on the line
7	05/20/08	004016422 JJK	239	64476	46,320	Yes/small spots of Oil	on the line
8	5-21-08	004016460 JJK	224	64489	39,600	6% SIB oil	" "
9	5-22-08	004016497 JJK	1264	64490	40,920	?	
10							
11							

CES Environmental Services, Inc.

5/20/2008 STATUS, Update

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
1	5/12/08	004016129 JJK	LT-423	63931	41,660	Yes/2% Oil	DONE, 5-17-2008
2	5/13/08	004016129 JJK	239	63932	41,060	Yes/2% Oil	DONE 5-15-2008
3	5/14/08	004016235 JJK	224	63933	41,670	Yes/2% Oil	~~on the line;~~ ~~NEXT to PROCESS~~ DONE
4	5/15/08	004016255 JJK	1264	63934	41,960	Yes/2% Oil	Next on the line
5	5/16/08	004016321 JJK	2815	63935	39,920	Yes/2% Oil	on the line
6	5-17-08	004016351 JJK	LT-423	63936	40,560	Yes ~~No~~ /1% Oil	" "
7	5-20-08	004016422 JJK	239	64476	46,320	Yes/ just spots of oil	" "
8							
9							
10							
11							
12							

CES Environmental Services, Inc.

5/17/2008 STATUS, Update

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
1	5/12/08	004016129 JJK	LT-423	63931	41,660	Yes/2% Oil	PROCESSING 5-17-2008
2	5/13/08	004016129 JJK	239	63932	41,060	Yes/2% Oil	DONE 5-15-2008
3	5/14/08	004016235 JJK	224	63933	41,670	Yes/2% Oil	NEXT to PROCESS
4	5/15/08	004016255 JJK	1264	63934	41,960	Yes/2% Oil	on the line
5	5/16/08	004016321 JJK	2815	63935	39920	Yes/2% Oil	on the line
6							
7							
8							
9							
10							
11							
12							

CES Environmental Services, Inc.

5/15/2008 STATUS, Update

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
1	5/12/08	004016129 JJK	LT-~~423~~	63931	41,660	Yes/2% Oil	5-16 NEXT TO PROCESS
2	5/13/08	004016129 JJK	~~239~~	63932	41,060	Yes/2% Oil	Done PROCESSING 5-1~~6~~ 2008
3	5/14/08	004016235 JJK	224	63933	41,670	Yes/~~2~~ 3% Oil	on the line
4	5-15-08	004016255 JJK	1264	63934	41,960	Yes/2% Oil	on the line
	5-16-08	004016321 JJK	2815	63935	39,920	Not Sampled	" "
5							
6							
7							
8							
9							
10							
11							

CES Environmental Services, Inc.

5/2/2008 STATUS

PROFILE NO. 2696

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
~~1~~	~~4/8/08~~	~~004013923 JJK~~	~~638035-0~~	~~61849~~	~~34,400~~		PROCESSED
~~2~~	~~4/11/08~~	~~004014541 JJK~~	~~124223-2~~	~~62045~~	~~4,320~~		PROCESSED
~~3~~	~~4/13/08~~	~~004014604 JJK~~	~~638035~~	~~62246~~	~~41,520~~		PROCESSED (4-21-08)
4	~~*4/14/08*~~	~~*004014605 JJK*~~	~~*255*~~	~~*62247*~~	~~*47,320*~~		PROCESSED (4-24-08)
~~5~~	~~*4/14/08*~~	~~*004014606 JJK*~~	~~*124221-1*~~ ***HAD A TOP OIL LAYER***	~~*62260*~~	~~*3,122 (calculated)*~~		~~PROCESSED (4-24-08)~~
~~6~~	~~04/14/08~~	~~004014609 JJK~~	~~LT-638~~	~~62261~~	~~2,544~~		~~PROCESSED~~
~~7~~	~~04/14/08~~	~~004014610 JJK~~	~~124238-2~~	~~62262~~	~~45,000~~		~~PROCESSED~~
8	~~04/15/08~~	~~004014645 JJK~~	~~124238-2~~	~~62248~~	~~2,619~~		~~PROCESSED~~
~~9~~	~~04/16/08~~	~~00401671 JJK~~	~~124223-2~~	~~62351~~	~~41,080~~		~~PROCESSED~~
10	~~04/16/08~~	~~004014672 JJK~~	~~1264~~	~~**62352**~~	~~47,260~~		~~PROCESSED~~
11	~~04/17/08~~	~~00414696 JJK~~	~~2815~~	~~**62250**~~	~~48,480~~		~~SHIPPED~~
12	04/18/08	004014841 JJK	638035	**62251**	38,320	UNDERGOING TREATMENT WORKUP	On the line

EPAHO113001779

2 SIB STATUS Load Receipt and Processing Data Sheet, 5-2-2008

SIB RECEIPT & PROCESSING DATA SHEET

LOAD #	LOAD RECEIPT DATE	MANIFEST NUMBER	TRAILER NUMBER	JOB NUMBER	GALLONS / POUNDS	SAMPLED/ NOTES	STATUS
13	~~4/22/08~~	~~004014981 JJK~~	~~255~~	~~62704~~	~~37,020~~	~~Yes~~	SHIP ~~Saturday~~
14	~~4/23/08~~	~~004014001 JJK~~	~~239~~	~~62705~~	~~48,000~~	~~Yes~~	SHIP ~~Saturday~~
15	~~4/24/08~~	~~004014017 JJK~~	~~241~~	~~62706~~	~~5,303~~	~~Yes~~	SHIP ~~Saturday~~
16	**4/25/08**	**004014065 JJK**	~~210~~	**62707**	**44,360**	Yes, Has about 2% top Oil	~~**NEXT TO PROCESS 5-2-2008**~~
17	~~4/26/08~~	~~004014108 JJK~~	~~LT-638~~	~~62708~~	~~44,780~~	~~Yes~~	SHIP ~~Sunday~~
18	4/28/08	004014080 JJK	2 124223	62959	34,480	Yes, Has about 2% top Oil	On the line
19	4/29/08	004014156 JJK	3 T-876641-6	62960	35,360	Yes, Has about 2% top Oil	On the line
20	~~4/30/08~~	~~004014213 JJK~~	~~124105~~	~~62961~~	~~41,160~~	~~Yes~~	SHIP ~~Sunday~~
21	5/1/08	004014267 JJK	~~124221~~	62962	41,280	~~Yes, Has about 2% top Oil~~	Shipped ~~On the line~~
22	5-3	004014332 JJK	124238 4	63580	39,840	OK - some oil droplets	
23							
24							
25							

Gary Peterson

From: Gary Peterson
Sent: Wednesday, April 30, 2008 4:50 PM
To: Matt Bowman
Cc: Miles Root; Marlin Moser
Subject: SIB Testing, 4-30-2008

The following trailers were sampled:

1. 2815
2. 638035
3. 255
4. 239
5. 241

A composite of these trailers was made and a series of testing was completed on the composite. The material is not a known composition consisting of Sodium hydroxide, sodium hydrosulfide and sodium sulfide only. Part of the material composition consists of low percent levels of sulfur compounds. Because of the variance of the composition of the sulfur compounds present a true Sodium Hydrosulfide Analytical Procedure (A,B,C test) cannot be run. The following testing data has been generated on this material.

1. pH = 12.42
2. Density = 1.37
3. Acid Base Titration using 0.01 N HCL – The weight percent of Base compounds titrated as NaOH is 6.28%. The weight percent as Na is 3.61%
4. Sulfide Potentiometric Titration using 0.05 N AgNO3 – The weight percent of Sulfide compounds titrated as S is 3.98%. The weight percent of Sulfide compounds titrated as RSH is 3.63%

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

Tracking:

Recipient	Read
Matt Bowman	
Miles Root	Read: 5/1/2008 7:19 AM
Marlin Moser	Read: 4/30/2008 4:56 PM

Gary Peterson

From: Gary Peterson
Sent: Monday, May 19, 2008 8:41 AM
To: Matt Bowman; Marlin Moser
Subject: Sulfide & Mercaptan levels of SIB Loads, 5-20-08
Attachments: 5 SIB STATUS Load Receipt and Processing Data Sheet, 5-20-2008.xls

The sulfide and mercaptan levels of the last 5 loads of received SIB are as follows:

SIB Load Sulfide & Mercaptan Levels			
DATE	TRAILER	SULFIDE (ppm)	Mercaptan (ppm)
5-12-08	LT-423	28,360	96,970
5-13-08	239	1,817	64,960
5-14-08	224	9,410	51,500
5-15-08	1264	16,640	67,010
5-16-08	2815	17,360	72,100

Also attached is the SIB receipt and Processing data sheet.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

Trailer 224 3

CES Environmental Services, Inc.

004016235 JJK

PRODUCT PROCESSING DATA REPORT

224 Oil phase = 5,250 mercaptan

Date: 5-14-08 JOB Number (or other type of information): 63933

004016235 Customer, Product Description, Other Information 3,359 TOC

PRODUCT: SIB

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other
		9,410	51,500		
1.33875	12.62	0.941 %	5.150 %	~~20~~% 0.1	#'s/gal 11.2

1.34

OTHER INFORMATION: 41,670 #'s 3,720 gallons

STARTING VOLUME: 200

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
		1,116	1
	Use 30%	~~930 gal~~	2
	1,116	~~1,302~~ 303	3
			4
			5
			6
			7
			8
			9
		419	10
			11
			12
			13
			14
			15
		7	16
			17
			18
			19
		171	20
			21

PROCESSING NOTES:

30 ~~25%~~ H_2O_2 50ml 148°F Pretty reactive
30 ~~35%~~ H_2O 70ml 124°F

Acid 122°F
~~5ml~~ = 140°F
~~10ml~~ = 152°F Foam - 9 - 7 Heavy
4.5pH 17ml
~~15ml~~ - 152 F pH = 7 foaming
~~17ml~~ 142°F pH = 4.5 Foaming slowing
reddish color fading
11.05% ~~18ml~~ - creamy orangish pH = 3-3.5
19ml - pH = 3
20ml pH = 2.60
20.5ml 2.31
21ml 2.17
21.5 2.06
~~22ml~~ 1.97
22.5ml 1.92

~~10%~~ .2% Ferric .4ml pH = 2.03

Caustic (50%) ~~25ml~~ 255pH 4ml = 3.55
~~5ml~~ pH = 3.57
~~5.5ml~~ pH = 4.0 6ml ~~7ml~~ pH =
4.6% 8ml pH = 6.23 6.5 pH = 6.30 ~~6.8ml~~ pH = 5.52
9ml pH = 7.64 9.5 pH = 12.01
ML = 9.2ml

Product Processing Log Sheet, Edited, MASTER, 5-1-2008 GRP

33 gal .9% Poly: 1.8ml % Solids - 18%

EPAHO113001784

S = 3,700
8.39 pH = RSH = 17,800

Acid

200 ml

5 ml	pH 7	S = 770 RSH = ~~[illegible]~~ 900
7 ml	pH 3.5	S = 0 RSH 1,110

2nd test 45 min S = 0 RSH = 830 ppm

200 ml

$\boxed{8.39 \rightarrow 4.65}$

5.5 ml Acid S = 620 Sulfide RSH = ~~[illegible]~~ 700 mercap

2nd run 1 hr. Later 0 - S 0 - RSH

pH 4.65 - Strong Odor

.5 ml	pH 5.88	Mild Odor
.6 ml	pH = 6.43	Odor Gone
.7 ml	pH = 7.30	Odor Gone

EPAHO113001785

SIB Hazardous Wastewater TREATMENT PROCESSING

5-17-2008

CONTAINER 224

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 63933

Manifest Number: 004016235 JJK

Trailer Number: 224

Gallons: 3,720 gallons ; 41,670 pounds ALL TREATMENT VOLUMES BASED ON THIS QUANTITY

pH= 12.62, density = 1.34,Sulfide= 9,410, Mercapatan = 51,500 Oil= 2%

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

N/A: THE OIL LAYER MUST BE SEPARATED & REMOVED FROM THE MATERIAL FOR THE PROCESSING OF THIS CONTAINER (LEAVE THE TOP OIL IN THE TRAILER). IF NOT REMOVED THE OIL WILL REMAIN AS AN OIL THROUGHOUT THE ENITRE TREATMENT AND BE A TOP OIL ORGANIC LAYER AFTER TREATMENT. THIS WILL CAUSE PROBLEMS.

For the pH target the pH is 1.8 (range 1.6 -1.9). MAKE SURE THE TARGET PH IS MET, THIS IS A CRITICAL PART OF TREATMENT. It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.

PLEASE FOLLOW ALL TREATMENT AND PROCESSING PRECAUTIONS PREVIOUSLY ESTABLISHED FOR THE REACTIONS INVOLVED IN THE TREATMENT AND HANDLING OF THIS MATERIAL.

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are

captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK.

NOTE: ALL GALLON VOLUMES ARE BASED ON A PERCENTAGE BY TREATMENT. THE VOLUMES IN THE TANK MAY NOT BE EXACT. BECAUSE OF THIS WHEN AROUND 75% OF THE REQUIRED STATED TREATMENT VOLUMES LISTED BELOW ARE REACHED START ADDING THE TREATMENT CHEMICALS SLOWLY AND BY SMALL ADDITIONAL VOLUMES. THIS IS VERY IMPORTANT TO TREAT THE SIB MATERIAL CORRECTLY AND PRODUCE A QUALITY TREATED WATER.

1. ***PEROXIDE & WATER ADDITION*** : *930 (25% BY VOLUME)* gallons of 10% CONCENTRATION hydrogen peroxide; 1,302 gallons of water *(35% BY VOLUME)* (TOTAL peroxide & water equal approximately 60% of the received volume of SIB). **During this part of the treatment process the temperature can reach as high as 180 degrees F, *ADD WITH CAUTION; THE PEROXIDE REACTION CAN BE VERY VIOLENT IF ADDED TO FAST, REDUCE GPM TO 3 GPM OR LOWER IF NECESSARY.*** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ***ACID ADDITION*** : ***pH TARGET = 1.8*** ADD 419 GALLONS (approximately, 11.25 % of the received volume of SIB) OF SULFURIC ACID. The gallon volume required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then

stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS). HEAVY SOLIDS START FORMING AROUND A PH OF 9 & CONTINUE TO FORM UNTIL A PH OF AROUND 4 IS REACHED. ACID ADDITION slow gpm & WELL MIXING IN THE TANK IS CRITICAL AND VERY IMPORTANT AT THIS STAGE OF TREATMENT. **The acid treatment pH target point is a pH of 1.8 su (RANGE 1.6 – 1.9).** ***The sulfides at the target pH (1.8) will be driven off to the scrubber; this may just take a little more mixing & process scrubbing time.*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 1.9 pH, 1.6 – 2.0 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). **ONCE THE CORRECT PH HAS BEEN MET LET THE TANK MIX AND DIGEST THE ORGANICS PRESENT FOR AT LEAST 2 HOURS TO MAKE SURE THE FINAL COLOR IS LIGHT.** Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. ADD Approximately 7 GALLONS OF FERRIC CHLORIDE **, DO NOT ADD SO MUCH FERRIC CL SO THE MATERIAL TURNS BLACK. YOU DO NOT NEED THIS MUCH FERRIC. ADD A COUPLE OF GALLONS AND THEN CHECK THE TANK. THEN ADD SLOWLY, 1/2 GALLON AT A TIME FROM THEN ON.** **Ferric Chloride** addition. Add a total volume of ferric chloride to be **.2 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. **SODIUM HYDROXIDE ADDITION (50% CONCENTRATION):** ADD 171 GALLONS OF SODIUM HYDROXIDE caustic, TARGET PH IS 9.0 (approximately, 4.6 % of the received volume of SIB), gradually add

lime and check the pH and color until you reach the target pH. **The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.** Proceed to step 5.

5. ADD 33 GALLONS OF POLYMER (approximately, .9 % of the received volume of SIB). ADD SLOWLY. Proceed to step 6.
6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.
7. With all of the processing steps completed catch a sample from the mixing vessel. Test for pH, sulfides, mercaptans, TOC and metals (THE QUICK ammonia TEST shows high ppm of ammonia, the waste stream only has about 28 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.
8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

The Solids FORMED WITH USING CAUSTIC (SODIUM HYDROXIDE) with this batch is 18 % not back calculated to the original volume.

CES Environmental Services, Inc.

traile 239 2

PRODUCT PROCESSING DATA REPORT

Date: 5-14-08 JOB Number (or other type of information): 63932

Customer, Product Description, Other Information 004016189 JJK

PRODUCT : SIB

2696

	Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other
Product Physical Characteristics	1.34	11.05	1,817	64,960	2% OBV	#'s/gal 11.2

STARTING VOLUME: 200ml

OTHER INFORMATION: #'s 41,060 gallons 3,666 gallons 2% Oil

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

			1
	917gal	25%	2
	1,283 gal	35%	3
			4
			5
			6
	~~403~~	~~11%~~	7
	421.6	11.5	8
			9
			10
			11
			12
			13
	5.5 gal	.075%	14
			15
			16
		116 gal	17
			18
			19
		37 gal	20
			21

PROCESSING NOTES:

H_2O_2 25% 92 °F

H_2O 35% 87 °F

Acid
- 5ml 108°F pH = 9
- 10ml 116°F pH = 9
- 15ml Heavy foam sludge pH = 7.8
- 16ml pH = 5
- 17ml pH = 5
- 18ml pH - 4 turned creamy - then came back to orange
- 19ml creamy & back to orange
- 20ml pH - 3
- 21ml pH = 2
- 22ml pH = 1.79 (2.58) 23ml = 2.12

Ferric ~~5ml~~ .15ml

Caustic 6.5 $\boxed{3.15\%}$
- 3ml pH = 2.45
- 5ml pH 3.57
- 6ml pH = 4.54
- 6.5ml pH = 5.93
- $\boxed{\text{7ml pH = 11.08}}$
- 6.3ml

Poly 1ml

Product Processing Log Sheet, Edited, MASTER, 5-1-2008

GRP

EPAHO113001790

SIB Hazardous Wastewater TREATMENT PROCESSING

5-14-2008

CONTAINER 239

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 63932

Manifest Number: 004016189 JJK

Trailer Number: 63932

Gallons: 3,666 gallons ; 41,060 pounds ALL TREATMENT VOLUMES BASED ON THIS QUANTITY

pH= 11.05 , density = 1.34

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

This material has 2% oil layer and did not cause a problem.

N/A : THE OIL LAYER MUST BE SEPARATED & REMOVED FROM THE MATERIAL FOR THE PROCESSING OF THIS CONTAINER (LEAVE THE TOP OIL IN THE TRAILER). IF NOT REMOVED THE OIL WILL REMAIN AS AN OIL THROUGHOUT THE ENITRE TREATMENT AND BE A TOP OIL ORGANIC LAYER AFTER TREATMENT. THIS WILL CAUSE PROBLEMS.

For the pH target the pH is 1.8 (range 1.6 -1.9). ***MAKE SURE THE TARGET PH IS MET, THIS IS A CRITICAL PART OF TREATMENT.*** *It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.*

PLEASE FOLLOW ALL TREATMENT AND PROCESSING PRECAUTIONS PREVIOUSLY ESTABLISHED FOR THE REACTIONS INVOLVED IN THE TREATMENT AND HANDLING OF THIS MATERIAL.

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. <u>During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK.</u>

NOTE: ALL GALLON VOLUMES ARE BASED ON A PERCENTAGE BY TREATMENT. THE VOLUMES IN THE TANK MAY NOT BE EXACT. BECAUSE OF THIS WHEN AROUND 75% OF THE REQUIRED STATED TREATMENT VOLUMES LISTED BELOW ARE REACHED START ADDING THE TREATMENT CHEMICALS SLOWLY AND BY SMALL ADDITIONAL VOLUMES. THIS IS VERY IMPORTANT TO TREAT THE SIB MATERIAL CORRECTLY AND PRODUCE A QUALITY TREATED WATER.

1. ***PEROXIDE & WATER ADDITION :*** <u>*917 (25% BY VOLUME)* gallons of 10% CONCENTRATION hydrogen peroxide; 1,283 gallons of water *(35% BY VOLUME)* (TOTAL peroxide & water equal approximately 60% of the received volume of SIB).</u> <u>**During this part of the treatment process the temperature can reach as high as 180 degrees F, *ADD WITH CAUTION; THE PEROXIDE REACTION CAN BE VERY VIOLENT IF ADDED TO FAST, REDUCE GPM TO 3 GPM OR LOWER IF NECESSARY.***</u> The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ***ACID ADDITION*** : <u>***pH TARGET = 1.8*** ADD 421.6 GALLONS (approximately, 11.5 % of the received volume of SIB) OF SULFURIC ACID. The gallon volume required is not an exact volume. As you near the pH</u>

target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS). HEAVY SOLIDS START FORMING AROUND A PH OF 9 & CONTINUE TO FORM UNTIL A PH OF AROUND 4 IS REACHED. ACID ADDITION slow gpm & WELL MIXING IN THE TANK IS CRITICAL AND VERY IMPORTANT AT THIS STAGE OF TREATMENT. **The acid treatment pH target point is a pH of 1.8 su (RANGE 1.6 – 1.9).** ***The sulfides at the target pH (1.8) will be driven off to the scrubber; this may just take a little more mixing & process scrubbing time.*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 1.9 pH, 1.6 – 2.0 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. ADD Approximately 5.5 GALLONS OF FERRIC CHLORIDE **, DO NOT ADD SO MUCH FERRIC CL SO THE MATERIAL TURNS BLACK. YOU DO NOT NEED THIS MUCH FERRIC. ADD A COUPLE OF GALLONS AND THEN CHECK THE TANK. THEN ADD SLOWLY, 1/2 GALLON AT A TIME FROM THEN ON.** **Ferric Chloride** addition. Add a total volume of ferric chloride to be **.075 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. **SODIUM HYDROXIDE ADDITION (50% CONCENTRATION):** ADD 116 GALLONS OF SODIUM HYDROXIDE caustic, TARGET PH IS 9.0 (approximately, 3.15 % of the received volume of SIB), gradually add lime and check the pH and color until you reach the target pH. **The gallon**

volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point. Proceed to step 5.

5. **ADD 37 GALLONS OF POLYMER (approximately, .5 % of the received volume of SIB).** ADD SLOWLY. Proceed to step 6.
6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.
7. With all of the processing steps completed catch a sample from the mixing vessel. Test for pH, sulfides, mercaptans, TOC and metals (THE QUICK ammonia TEST shows high ppm of ammonia, the waste stream only has about 28 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.
8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

The Solids FORMED WITH USING CAUSTIC (SODIUM HYDROXIDE) with this batch is 18 % not back calculated to the original volume.

Gary Peterson

From: Gary Peterson
Sent: Wednesday, May 14, 2008 3:22 PM
To: Bo Cumberland; Brian Weathers
Cc: Marlin Moser; Matt Bowman; Sam Brown; Godefroy Gbery; Miles Root
Subject: SIB treatment, 5-14-2008, Trailer 239
Attachments: SIB, 5-14-08, BATCH TRAILER 239 Treatment Processing.doc

Bo,
The Attached information will allow you to do your scheduling.

There is no reason the batch treated water in the plant should not be a very light rose yellow color. The key is reaching a pH of less than 2. Then letting the batch mix for at least an hour to let the acid digest the material. If the pH rises then bring it back down.

The treated water from this batch is a very light color.

Gary R. Peterson
Laboratory and Quality Assurance Manager
CES Environmental Services, Inc.
(832) 367-1383 (cellular)

Tracking:

Recipient	Read
Bo Cumberland	Read: 5/14/2008 3:23 PM
Brian Weathers	
Marlin Moser	
Matt Bowman	
Sam Brown	
Godefroy Gbery	
Miles Root	Read: 5/14/2008 3:54 PM

CES Environmental Services, Inc.

Trailer LT-423

(1)

PRODUCT PROCESSING DATA REPORT

Oil phase = 3,320

Date: 5-14-08 JOB Number (or other type of information): 63931

Customer, Product Description, Other Information 004 016129 JJK

PRODUCT : SIB

2696

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other #'s/gal	Other
1.37534	12.21	28,360	96,970	11.43	

1.37

OTHER INFORMATION: 41,660 #'s ; gallons = 3,645

STARTING VOLUME: 200

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
			1
		911 gal	2
		1,276 gal	3
			4
			5
			6
		528.5 gal	7
			8
			9
			10
			11
			12
			13
		9 gal	14
			15
		91 gal	16
			17
		18 gal	18
			19
			20
			21

PROCESSING NOTES:

252 H_2O_2 90°F

352 H_2O

ACID

~~5ml~~

~~10ml~~ 112

~~15ml~~ 122

14.5% ~~19ml~~ pH = 9 Heavy sludge

~~20~~ pH = 9

~~21ml~~ pH = 8

~~23~~ pH = 7.8

~~24~~ pH = 4.0

~~25~~

~~26~~ 3

~~27~~ 3

28 - pH = 2.19 28.5 = 2.03

$\boxed{29.0 = pH = 1.88}$

.25% Ferric .5ml

Caustic ~~3ml~~ pH = 4.0

2.5% 5ml pH = 8.15

.5% Poly 1ml

Product Processing Log Sheet, Edited, MASTER, 5-1-2008

GRP

EPAHO113001797

LT-423

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 5-16-08 JOB Number (or other type of information):

Customer, Product Description, Other Information

PRODUCT: SIB + T4 H_2O

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other

OTHER INFORMATION: 1:1 w/ T4 new Plant Water

STARTING VOLUME: 200

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
			1
			2
			3
			4
			5
			6
			7
			8
			9
			10
			11
			12
			13
			14
			15
			16
			17
			18
			19
			20
			21

PROCESSING NOTES:

25% of 5% H_2O_2 50ml
~~20ml~~ 90°F 50ml 110°F

Acid 5ml 130°F pH = 9-10
~~9ml~~ 136F pH = 9
~~10ml~~ pH = 8.5
11ml Heavy Foam 130°F - 4.58
~~11.5ml~~
12.5ml pH = 2.09
13ml pH = 1.88

Ferric .15ml

Caustic

4.6 pH 9.6

1.2 2.8 pH
2.0ml pH = 3.45
~~2.6~~ 4.46
3.4 5.80
3.8 6.32
4.0 6.62
4.2 6.96
4.4 7.60

Poly

Product Processing Log Sheet, Edited, MASTER, 5-1-2008

GRP

EPAHO113001798

SIB Hazardous Wastewater TREATMENT PROCESSING

5-16-2008 **CONTAINER LT-423**

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 69391

Manifest Number: 004016129 JJK

Trailer Number: 63931

Gallons: 3,645 gallons ; 41,660 pounds ALL TREATMENT VOLUMES BASED ON THIS QUANTITY

pH= 12.21 , density = 1.37

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

N/A: THE OIL LAYER MUST BE SEPARATED & REMOVED FROM THE MATERIAL FOR THE PROCESSING OF THIS CONTAINER (LEAVE THE TOP OIL IN THE TRAILER). IF NOT REMOVED THE OIL WILL REMAIN AS AN OIL THROUGHOUT THE ENITRE TREATMENT AND BE A TOP OIL ORGANIC LAYER AFTER TREATMENT. THIS WILL CAUSE PROBLEMS.

For the pH target the pH is 1.8 (range 1.6 -1.9). MAKE SURE THE TARGET PH IS MET, THIS IS A CRITICAL PART OF TREATMENT. It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.

PLEASE FOLLOW ALL TREATMENT AND PROCESSING PRECAUTIONS PREVIOUSLY ESTABLISHED FOR THE REACTIONS INVOLVED IN THE TREATMENT AND HANDLING OF THIS MATERIAL.

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are

captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK.

NOTE: ALL GALLON VOLUMES ARE BASED ON A PERCENTAGE BY TREATMENT. THE VOLUMES IN THE TANK MAY NOT BE EXACT. BECAUSE OF THIS WHEN AROUND 75% OF THE REQUIRED STATED TREATMENT VOLUMES LISTED BELOW ARE REACHED START ADDING THE TREATMENT CHEMICALS SLOWLY AND BY SMALL ADDITIONAL VOLUMES. THIS IS VERY IMPORTANT TO TREAT THE SIB MATERIAL CORRECTLY AND PRODUCE A QUALITY TREATED WATER.

1. ***PEROXIDE & WATER ADDITION*** *:* *911 (25% BY VOLUME)* gallons of 10% CONCENTRATION hydrogen peroxide; 1,276 gallons of water *(35% BY VOLUME)* (TOTAL peroxide & water equal approximately 60% of the received volume of SIB). **During this part of the treatment process the temperature can reach as high as 180 degrees F,** ***ADD WITH CAUTION; THE PEROXIDE REACTION CAN BE VERY VIOLENT IF ADDED TO FAST, REDUCE GPM TO 3 GPM OR LOWER IF NECESSARY.*** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ***ACID ADDITION*** *:* ***pH TARGET = 1.8*** ADD 528.5 GALLONS (approximately, 14.5 % of the received volume of SIB) OF SULFURIC ACID. The gallon volume required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then

stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS). HEAVY SOLIDS START FORMING AROUND A PH OF 9 & CONTINUE TO FORM UNTIL A PH OF AROUND 4 IS REACHED. ACID ADDITION slow gpm & WELL MIXING IN THE TANK IS CRITICAL AND VERY IMPORTANT AT THIS STAGE OF TREATMENT. **The acid treatment pH target point is a pH of 1.8 su (RANGE 1.6 – 1.9).** ***The sulfides at the target pH (1.8) will be driven off to the scrubber; this may just take a little more mixing & process scrubbing time.*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 1.9 pH, 1.6 – 2.0 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). **ONCE THE CORRECT PH HAS BEEN MET LET THE TANK MIX AND DIGEST THE ORGANICS PRESENT FOR AT LEAST 2 HOURS TO MAKE SURE THE FINAL COLOR IS LIGHT.** Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. ADD Approximately 9 GALLONS OF FERRIC CHLORIDE **, DO NOT ADD SO MUCH FERRIC CL SO THE MATERIAL TURNS BLACK. YOU DO NOT NEED THIS MUCH FERRIC. ADD A COUPLE OF GALLONS AND THEN CHECK THE TANK. THEN ADD SLOWLY, 1/2 GALLON AT A TIME FROM THEN ON.** **Ferric Chloride** addition. Add a total volume of ferric chloride to be **.25 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. **SODIUM HYDROXIDE ADDITION (50% CONCENTRATION):** ADD 91 GALLONS OF SODIUM HYDROXIDE caustic, TARGET PH IS 9.0 (approximately, 2.5 % of the received volume of SIB), gradually add

lime and check the pH and color until you reach the target pH. The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point. Proceed to step 5.

5. **ADD 18 GALLONS OF POLYMER (approximately, .5 % of the received volume of SIB).** ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Test for pH, sulfides, mercaptans, TOC and metals (THE QUICK ammonia TEST shows high ppm of ammonia, the waste stream only has about 28 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

The Solids FORMED WITH USING CAUSTIC (SODIUM HYDROXIDE) with this batch is 22 % not back calculated to the original volume.

SIB Hazardous Wastewater TREATMENT PROCESSING

5-16-2008

CONTAINER LT-423

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 69391

Manifest Number: 004016129 JJK

Trailer Number: 63931

Gallons: 3,645 gallons ; 41,660 pounds ALL TREATMENT VOLUMES BASED ON THIS QUANTITY

pH= 12.21 , density = 1.37

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

N/A: THE OIL LAYER MUST BE SEPARATED & REMOVED FROM THE MATERIAL FOR THE PROCESSING OF THIS CONTAINER (LEAVE THE TOP OIL IN THE TRAILER). IF NOT REMOVED THE OIL WILL REMAIN AS AN OIL THROUGHOUT THE ENITRE TREATMENT AND BE A TOP OIL ORGANIC LAYER AFTER TREATMENT. THIS WILL CAUSE PROBLEMS.

For the pH target the pH is 1.8 (range 1.6 -1.9). MAKE SURE THE TARGET PH IS MET, THIS IS A CRITICAL PART OF TREATMENT. It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.

PLEASE FOLLOW ALL TREATMENT AND PROCESSING PRECAUTIONS PREVIOUSLY ESTABLISHED FOR THE REACTIONS INVOLVED IN THE TREATMENT AND HANDLING OF THIS MATERIAL.

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are

captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK.

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1. ***PEROXIDE & WATER ADDITION*** : *911 (25% BY VOLUME)* gallons of 10% CONCENTRATION hydrogen peroxide; 1,276 gallons of water *(35% BY VOLUME)* (TOTAL peroxide & water equal approximately 60% of the received volume of SIB). **During this part of the treatment process the temperature can reach as high as 180 degrees F, *ADD WITH CAUTION; THE PEROXIDE REACTION CAN BE VERY VIOLENT IF ADDED TO FAST, REDUCE GPM TO 3 GPM OR LOWER IF NECESSARY.*** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ***ACID ADDITION*** : ***pH TARGET = 1.8*** ADD 528.5 GALLONS (approximately, 14.5 % of the received volume of SIB) OF SULFURIC ACID. The gallon volume required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then

stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS). HEAVY SOLIDS START FORMING AROUND A PH OF 9 & CONTINUE TO FORM UNTIL A PH OF AROUND 4 IS REACHED. ACID ADDITION slow gpm & WELL MIXING IN THE TANK IS CRITICAL AND VERY IMPORTANT AT THIS STAGE OF TREATMENT. **The acid treatment pH target point is a pH of 1.8 su (RANGE 1.6 – 1.9).** ***The sulfides at the target pH (1.8) will be driven off to the scrubber; this may just take a little more mixing & process scrubbing time.*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 1.9 pH, 1.6 – 2.0 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). **ONCE THE CORRECT PH HAS BEEN MET LET THE TANK MIX AND DIGEST THE ORGANICS PRESENT FOR AT LEAST 2 HOURS TO MAKE SURE THE FINAL COLOR IS LIGHT.** Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. ADD Approximately 9 GALLONS OF FERRIC CHLORIDE **, DO NOT ADD SO MUCH FERRIC CL SO THE MATERIAL TURNS BLACK. YOU DO NOT NEED THIS MUCH FERRIC. ADD A COUPLE OF GALLONS AND THEN CHECK THE TANK. THEN ADD SLOWLY, 1/2 GALLON AT A TIME FROM THEN ON.** **Ferric Chloride** addition. Add a total volume of ferric chloride to be **.25 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. **SODIUM HYDROXIDE ADDITION (50% CONCENTRATION):** ADD 91 GALLONS OF SODIUM HYDROXIDE caustic, TARGET PH IS 9.0 (approximately, 2.5 % of the received volume of SIB), gradually add

lime and check the pH and color until you reach the target pH. **The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.** Proceed to step 5.

5. ADD 18 GALLONS OF POLYMER (approximately, .5 % of the received volume of SIB). ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Test for pH, sulfides, mercaptans, TOC and metals (THE QUICK ammonia TEST shows high ppm of ammonia, the waste stream only has about 28 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

The Solids FORMED WITH USING CAUSTIC (SODIUM HYDROXIDE) with this batch is 22 % not back calculated to the original volume.

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 5-3-08 JOB Number (or other type of information): Job # 62251

Customer, Product Description, Other Information trailer 638035

PRODUCT : SIB

Product Physical Characteristics					
Density (S.G.)	Boiling Point (F,C) / pH	Sulfide ppm	Mercaptan ppm	Other	Other
1.36	12.50	22,980	67,400		

OTHER INFORMATION: 38,320 pounds; 11.35 #'s gallon
Gallons = 3,376

STARTING VOLUME: 200ml

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
		Gallons	1
		844	2
		1,182	3
			4
		304	5
			6
			7
			8
			9
		8 gal	10
			11
			12
	103 gal	~~300~~ gal	13
			14
			15
			16
		17	17
			18
			19
			20
			21

PROCESSING NOTES:

25% H_2O_2 50ml 126°F Not Violent
35% H_2O 70ml

ACID ~~5ml~~
99%
~~10ml~~ 146°F pH= 9 ~~14ml~~ = 4.0
~~15ml~~ pH = 2.86
~~16ml~~ pH = 2.24 creamy orange starting
~~17ml~~ pH = 1.94 Oil remains on top Oil must be removed.
18ml pH = 1.66

.30% Ferric .5ml

Caustic (50%)
3.05%
~~2ml~~ pH = 2.6
~~4ml~~ pH = 3.83
~~5ml~~ pH = 4.79
~~6ml~~ pH = 7.88
6.1ml
6.2 pH = 9.5
6.5ml pH = 12.10

.5% Poly 1ml

Solid = 10%

SIB Hazardous Wastewater TREATMENT PROCESSING

5-3-2008

CONTAINER 638035

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 62251

Manifest Number: 004014841 JJK

Trailer Number: 638035

Gallons: 3,376 ; 38,320 pounds ALL TREATMENT VOLUMES BASED ON THIS QUANTITY

pH= 12.50 , density = 1.36

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

THE OIL LAYER MUST BE SEPARATED & REMOVED FROM THE MATERIAL FOR THE PROCESSING OF THIS CONTAINER (LEAVE THE TOP OIL IN THE TRAILER). IF NOT REMOVED THE OIL WILL REMAIN AS AN OIL THROUGHOUT THE ENITRE TREATMENT AND BE A TOP OIL ORGANIC LAYER AFTER TREATMENT. THIS WILL CAUSE PROBLEMS.

For the pH target the pH is 1.8 (range 1.6 -1.9). ***MAKE SURE THE TARGET PH IS MET, THIS IS A CRITICAL PART OF TREATMENT.*** *It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.*

PLEASE FOLLOW ALL TREATMENT AND PROCESSING PRECAUTIONS PREVIOUSLY ESTABLISHED FOR THE REACTIONS INVOLVED IN THE TREATMENT AND HANDLING OF THIS MATERIAL.

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. <u>During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK.</u>

NOTE: ALL GALLON VOLUMES ARE BASED ON A PERCENTAGE BY TREATMENT. THE VOLUMES IN THE TANK MAY NOT BE EXACT. BECAUSE OF THIS WHEN AROUND 75% OF THE REQUIRED STATED TREATMENT VOLUMES LISTED BELOW ARE REACHED START ADDING THE TREATMENT CHEMICALS SLOWLY AND BY SMALL ADDITIONAL VOLUMES. THIS IS VERY IMPORTANT TO TREAT THE SIB MATERIAL CORRECTLY AND PRODUCE A QUALITY TREATED WATER.

1. ***PEROXIDE & WATER ADDITION*** *:* <u>*844 (25% BY VOLUME)* gallons of 10% CONCENTRATION hydrogen peroxide; 1,182 gallons of water *(35% BY VOLUME)* (TOTAL peroxide & water equal approximately 60% of the received volume of SIB).</u> <u>**During this part of the treatment process the temperature can reach as high as 180 degrees F,** ***ADD WITH CAUTION; THE PEROXIDE REACTION CAN BE VERY VIOLENT IF ADDED TO FAST, REDUCE GPM TO 3 GPM OR LOWER IF NECESSARY.***</u> The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ***ACID ADDITION : <u>pH TARGET = 1.8</u>*** <u>ADD 304 GALLONS (approximately, 9 % of the received volume of SIB) OF SULFURIC ACID. The gallon volume required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS).</u> HEAVY SOLIDS START FORMING AROUND A PH OF 9 & CONTINUE TO FORM UNTIL A PH OF AROUND 4 IS REACHED. <u>ACID ADDITION slow gpm & WELL MIXING IN THE TANK IS CRITICAL AND VERY IMPORTANT AT THIS STAGE OF TREATMENT.</u> **<u>The acid treatment pH target point is a pH of 1.8 su (RANGE 1.6 – 1.9).</u>** ***<u>The sulfides at the target pH (1.8) will be driven off to the scrubber; this may just take a little more mixing & process scrubbing time.</u>*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 1.9 pH, 1.6 – 2.0 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. <u>ADD Approximately 8 GALLONS OF FERRIC CHLORIDE</u> **<u>, DO NOT ADD SO MUCH FERRIC CL SO THE MATERIAL TURNS BLACK. YOU DO NOT NEED THIS MUCH FERRIC. ADD A COUPLE OF GALLONS AND THEN CHECK THE TANK. THEN ADD SLOWLY, 1/2 GALLON AT A TIME FROM THEN ON.</u>** **<u>Ferric Chloride</u>** addition. Add a total volume of ferric chloride to be **<u>.25 %</u>** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. **SODIUM HYDROXIDE ADDITION (50% CONCENTRATION):** ADD 103 GALLONS OF SODIUM HYDROXIDE caustic, TARGET PH IS 9.0 (approximately, 3.05 % of the received volume of SIB), gradually add lime and check the pH and color until you reach the target pH. **The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.** Proceed to step 5.

5. ADD 17 GALLONS OF POLYMER (approximately, .5 % of the received volume of SIB). ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Test for pH, sulfides, mercaptans, TOC and metals (THE QUICK ammonia TEST shows high ppm of ammonia, the waste stream only has about 28 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

The Solids FORMED WITH USING CAUSTIC (SODIUM HYDROXIDE) with this batch are 10 % not back calculated to the original volume.

4

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: 4-25-08 JOB Number (or other type of information): Trailer 1264

Customer, Product Description, Other Information Job # 62352

PRODUCT: S1B

Product Physical Characteristics			
Density (S.G.)	~~Boiling Point (F,C)~~ pH	Sulfide	Mercaptan
1.374	12.27	42470	0

STARTING VOLUME: 200

OTHER INFORMATION:
#'s = ~~41,090~~ 47,260
#/gal = 11.47 ~~3,582~~ gallons 4,120

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
			1
	1,030	~~896~~ gal	2
	1,442	~~1,254~~ gal	3
			4
			5
			6
	453 gal	~~394~~ gal	7
			8
			9
			10
			11
	8 gal	~~7~~ gal	12
			13
		~~394~~ gal	14
	453 gal		15
			16
	12.4 gal	10.8 gal	17
			18
			19
			20
			21

5-11-08

PROCESSING NOTES:	
25% H_2O_2 50 ml 35% H_2O 70 ml	25% H_2O_2 50 ml 25% 35% H_2O — 70 ml 35% 1,030 1,442
Acid ~~5ml~~ ~~10ml~~ ~~15ml~~ ~~18ml~~ pH = 4.5 11% ~~19ml~~ ~~20ml~~ pH = 3.0 ~~20.5~~ 2.23 21ml pH = 2.19 22ml pH = 1.84	Acid ~~10ml~~ 20ml pH = 4 474 ~~22~~ 3 11.5% 21ml 2.56 ~~22~~ 2.09 23 1.73 pH 2.19 Ferric 4.1 gal .2ml .1%
Ferric .4 ml .2%	NaOH 50% 2ml pH = 2.58
Lime ~~10ml~~ 11% ~~20ml~~ pH ~ 7 22ml pH ~ 8.5	149.2 ~~4ml~~ 4ml pH = 3.44 6ml pH = 4.87 3.5 7ml pH = 9.63
Poly .6ml .3%	Poly .8 ~~.6ml's~~ ~~3~~ gal .4%

GRP

EPAHO113001812

New

SIB Hazardous Wastewater TREATMENT PROCESSING

5-1-2008

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 62352

Manifest Number: 004014672 JJK

Trailer Number: 1264

Gallons: 4,120, 47,260 pounds ALL TREATMENT VOLUMES BASED ON THIS QUANTITY

pH= 12.27 , density = 1.34

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

For the pH target the pH is 1.9 (range 1.6 -1.9). MAKE SURE THE TARGET PH IS MET, THIS IS A CRITICAL PART OF TREATMENT. It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.

PLEASE FOLLOW ALL TREATMENT AND PROCESSING PRECAUTIONS PREVIOUSLY ESTABLISHED FOR THE REACTIONS INVOLVED IN THE TREATMENT AND HANDLING OF THIS MATERIAL.

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK.

NOTE: ALL GALLON VOLUMES ARE BASED ON A PERCENTAGE BY TREATMENT. THE VOLUMES IN THE TANK MAY NOT BE EXACT. BECAUSE OF THIS WHEN AROUND 75% OF THE REQUIRED STATED TREATMENT VOLUMES LISTED BELOW ARE REACHED START ADDING THE TREATMENT CHEMICALS SLOWLY AND BY SMALL ADDITIONAL VOLUMES. THIS IS VERY IMPORTANT TO TREAT THE SIB MATERIAL CORRECTLY AND PRODUCE A QUALITY TREATED WATER.

1. ***PEROXIDE & WATER ADDITION*** : *1,030 (25% BY VOLUME)* gallons of 10% CONCENTRATION hydrogen peroxide; 1,442 gallons of water *(35% BY VOLUME)* (TOTAL peroxide & water equal approximately 60% of the received volume of SIB). **During this part of the treatment process the temperature can reach as high as 180 degrees F,** ***ADD WITH CAUTION; THE PEROXIDE REACTION CAN BE VERY VIOLENT IF ADDED TO FAST, REDUCE GPM TO 3 GPM OR LOWER IF NECESSARY.*** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ***ACID ADDITION*** : ***pH TARGET = 1.8*** ADD 474 GALLONS (approximately, 11.5 % of the received volume of SIB) OF SULFURIC ACID. The gallon volume required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS). HEAVY SOLIDS START

FORMING AROUND A PH OF 9 & CONTINUE TO FORM UNTIL A PH OF AROUND 4 IS REACHED. ACID ADDITION slow gpm & WELL MIXING IN THE TANK IS CRITICAL AND VERY IMPORTANT AT THIS STAGE OF TREATMENT. **The acid treatment pH target point is a pH of 1.8 su (RANGE 1.6 – 1.9).** ***The sulfides at the target pH (1.8) will be driven off to the scrubber; this may just take a little more mixing & process scrubbing time.*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 1.9 pH, 1.6 – 2.0 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. ADD Approximately 4.1 GALLONS OF FERRIC CHLORIDE **, DO NOT ADD SO MUCH FERRIC CL SO THE MATERIAL TURNS BLACK. YOU DO NOT NEED THIS MUCH FERRIC. ADD A COUPLE OF GALLONS AND THEN CHECK THE TANK. THEN ADD SLOWLY, 1/2 GALLON AT A TIME FROM THEN ON.** **Ferric Chloride** addition. Add a total volume of ferric chloride to be **.1 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. **SODIUM HYDROXIDE ADDITION (50% CONCENTRATION):** ADD 144.2 GALLONS OF SODIUM HYDROXIDE caustic, TARGET PH IS 9.0 (approximately, 3.5 % of the received volume of SIB), gradually add lime and check the pH and color until you reach the target pH. **The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.** Proceed to step 5.

5. ADD 16.6 GALLONS OF POLYMER (approximately, .4 % of the received volume of SIB). ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Test for pH, sulfides, mercaptans, TOC and metals (THE QUICK ammonia TEST shows high ppm of ammonia, the waste stream only has about 28 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **<u>The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.</u>** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

The Solids FORMED WITH USING CAUSTIC (SODIUM HYDROXIDE) are ONLY 6% not back calculated to the original volume.

SIB Hazardous Wastewater TREATMENT PROCESSING

4-29-2008

OLD

BATCH SPECIFIC PROCESSING INFORMATION:

Job Number: 62352

Manifest Number: 004014672 JJK

Trailer Number: 1264

Gallons: 4,120, 47,260 pounds ALL TREATMENT VOLUMES BASED ON THIS QUANTITY

pH= 12.27 , density = 1.34

PROFILE: 2696

TREATMENT and HANDLING PROTOCOL

For the pH target the pH is 1.9 (range 1.6 -2.0). It may take a while for all of the sulfides to be driven from the low pH reaction vessel solution into the caustic scrubber. This will happen but it may take some time for the mixing and scrubber processing system to remove all of the sulfides.

PLEASE FOLLOW ALL TREATMENT AND PROCESSING PRECAUTIONS PREVIOUSLY ESTABLISHED FOR THE REACTIONS INVOLVED IN THE TREATMENT AND HANDLING OF THIS MATERIAL.

Treatment of this waste water is a multiple step treatment process. The material is very odorous so offloading the material into the treatment tank from the receiving container must be done carefully. Also all treatment steps need to be processed so that all vapors from the treatment and reaction in processing this material are captured through a processing scrubbing system. During the treatment of this materials for step one and step 2 it is suggested to have a water flow over the treatment tank to keep the tank from reaching high temperatures during the reaction phases of treatment. AT ANY TIME THAT THERE IS A SAMPLE CAUGHT FROM THE TREATMENT VESSEL MAKE SURE THAT THERE IS A BLOW DOWN TAKEN TO CLEAR THE SAMPLE LINE TO MAKE SURE THAT THE SAMPLE TAKEN FOR TESTING IS REPRESENTATIVE OF THE MATERIAL IN THE TANK.

1. ***PEROXIDE & WATER ADDITION*** : *1,030 (25% BY VOLUME)* gallons of 10% CONCENTRATION hydrogen peroxide; 1,442 gallons of water

(35% BY VOLUME) (TOTAL peroxide & water equal approximately 60% of the received volume of SIB). **During this part of the treatment process the temperature can reach as high as 180 degrees F, *ADD WITH CAUTION; THE PEROXIDE REACTION CAN BE VERY VIOLENT IF ADDED TO FAST, REDUCE GPM TO 3 GPM OR LOWER IF NECESSARY.*** The hydrogen peroxide addition can be stopped at any time and started again at any time to control the reaction rate, pressure buildup and the rise in temperature exotherm. When the last gallon of peroxide has been added let the reaction vessel agitate for approximately 30 minutes before continuing on the next treatment step.

2. ***ACID ADDITION : pH TARGET = 1.9*** ADD 453 GALLONS (approximately, 11 % of the received volume of SIB) OF SULFURIC ACID. The gallon volume required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more acid is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of acid is added. ACID ADDITION AND LET THE REACTION VESSEL MIX AND AGITATE UNTIL THE MIXTURE IN THE REACTION VESSEL IS ALL ONE WELL MIXED SLURRY (HOMOGENEOUS). **The acid treatment pH target point is a pH of 1.9 su (RANGE 1.6 – 2.0).** ***The sulfides at the target pH (1.9) will be driven off to the scrubber; this may just take a little more mixing & process scrubbing time.*** **Sample and test about every 20 minutes for sulfides. Continue mixing, scrubbing & sulfide testing until the sulfides are less than 3 ppm.** Continue this until the required pH, sulfide and mercaptan test parameters have been met (Target 1.9 pH, 1.6 – 2.0 pH su, less than 3 ppm sulfides and a small amount of mercaptans, very slight odor). Once step two of the treatment process is completed proceed on to treatment processing step 3.

3. ADD 8 GALLONS OF FERRIC CHLORIDE **Ferric Chloride** addition. Add a total volume of ferric chloride to be **.2 %** by volume of the initial volume of the SIB material pumped into the treatment vessel. Proceed to step 4.

4. **ADD 453 GALLONS OF LIME, TARGET PH IS 9.0 (approximately, 11 % of the received volume of SIB), gradually add lime and check the pH and color until you reach the target pH. The gallon volume of lime required is not an exact volume. As you near the pH target point stop acid addition and let the tank mix for 20-30 minutes or more & check the pH. If more lime is needed then add a little more then stop, agitate as above & check the pH again. Repeat this until the proper amount of has been added. This is the only way to reach the proper pH end point.** Proceed to step 5.

5. **ADD 12.4 GALLONS OF POLYMER (approximately, .3 % of the received volume of SIB).** ADD SLOWLY. Proceed to step 6.

6. Let the entire treated vessel mix and agitate for about 20-30 minutes or more. This time will allow the entire treated volume to form a good particulate flock that will process will through the press. Proceed to step 7.

7. With all of the processing steps completed catch a sample from the mixing vessel. Test for pH, sulfides, mercaptans, TOC and metals (THE QUICK ammonia TEST shows high ppm of ammonia, the waste stream only has about 28 ppm). Then finalize the treatment by processing the entire vessel through the press to a holding tank. This water can then process through the waste water treatment system. THE WATER IS TREATED. MAKE SURE THE TREATED WATER DOES NOT FORM SOLIDS WHEN MIXED WITH TREATED & SETTLED WASTE WATER AND ALSO WITH THE CLAIRIFIER. THE CLARIFIER SHOULD BE FREE OF SOLIDS. THIS MATERIAL MAY CAUSE SOLIDS IN THE CLAIRIFIER TO COAGULATE AND CREATE LARGE SOLID CLUMPS.

8. **The liquid material in the caustic scrubber holding tank must be segregated and held. This is a very odorous material and contains a high concentration of toxic sulfide compounds.** This material must avoid acids and any contact with liquids or materials of a low pH. Contact management for proper handling of the caustic material from the caustic scrubber unit.

The Solids are 20% not back calculated to the original volume.

CES Environmental
Services, Inc.

PRODUCT PROCESSING DATA REPORT

Date: July 11, 2008 **JOB Number (or other type of information):** Enterprise Caustic, 67776, Trailer 232, In SIB tank, profile 2317

Customer, Product Description, Other Information

PRODUCT : Sulfidic Caustic

Product Physical Characteristics					
Density (S.G.)	**Boiling Point (F,C) / pH**	**Sulfide**	**Mercaptan**	**% NaOH**	**Other**
1.04	13.2	**28,000**	**0**	**2.37**	

STARTING VOLUME: 100 mls

OTHER INFORMATION:

The tank truck volume was approximately 4,173 gallons

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION			
			1
			2
			3
			4
			5
			6
			7
			8
			9
			10
			11
			12
			13
			14
			15
			16
			17
			18
			19

PROCESSING NOTES:

ACID: Treat with acid to a pH of 2.0 (1.5 - 2.5 is OK). This requires about 4.2 % by volume of sulfuric acid. The color will change when the low pH has been met. **THIS VOLUME IS APPROXIMATELY 175 GALLONS.** After the pH has been met continue the mixing and scrubbing of the treat tank until all of the sulfides are gone. The water should not be a very offensive odor when all of the sulfides are gone. **AT A PH AROUND A 7 THERE IS QUITE A BIT OF CARBONATE DEGASSING, CAUTION AT THIS POINT.**

Treat with 5% by volume of a 10% concentration hydrogen peroxide. **THIS VOLUME IS APPROXIMATELY 208 GALLONS.**

Treat with caustic (50% concentration) until the pH is around an 6. At this point stop and take the water to a Waste Water Treatment Tank. (this will take about 180 gallons of caustic)

Add Ferric chloride, 4 Gallons. Then treat with lime to a pH of around 8.5 to a 9.0. Then add the polymer and flock the tank as usual for waste water treatment. Settle the tank and continue the treatment as usual for Waste Water.

CES Environmental Services, Inc.

PRODUCT PROCESSING DATA REPORT 67776

Date: 7-10-08 JOB Number (or other type of information): Caustic, trl. 232

Customer, Product Description, Other Information

PRODUCT: Caustic

2317

Density (S.G.)	Boiling Point (F,C) / pH	Sulfide	Mercaptan	Other	Other NaOH
1.04	13.2	28,000	0	8.67 #/gl	2.37%

OTHER INFORMATION: 4,173 gal

STARTING VOLUME: 100 ml

PROCESSING INFORMATION

SPECIFIC DATA LOG INFORMATION

			1
			2
			3
		175 gal	4
			5
			6
			7
		208	8
			9
			10
			11
			12
			13
			14
			15
			16
			17
			18
			19
			20
			21

PROCESSING NOTES:

Acid pH

1 ml 10.85

2.4 ml 8.37 → pH 7-4 High CO_2↑

~~4.0 ml~~ 3 ml 3.31

4.2 ml 2.01 pH

5% Peroxide (1:2)

Caustic

5.3 ml pH = 8

208 gal caustic

treat to units

Product Processing Log Sheet, Edited, MASTER, 5-1-2008

GRP

EPAHO113001821

LAB MEMOS - 2008
JAN → JUNE

LAB
T-48
8/4/09
ce

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman, Joy Baker
Cc: Gary Lenertz, Marlin Moser, Bo Cumberland

Date: 01/24/08

From: Miles Root

Lab Memo: 08-010

Subject: **Noltex Methanol/Vinyl Acetate Stream - Sample Evaluation 0108-29**

A sample from Noltex on Strang Road containing a mixture of methanol and vinyl acetate has been evaluated for potential processing at CES. This mixture has good potential for recovering a stream of 70% + of methanol and a second stream of 90% + vinyl acetate

Experimental/Discussion

This stream contains of at least methanol, vinyl acetate, and methyl acetate, along with some other unknown species. Since this mixture contained both methanol and vinyl acetate, a plan was proposed to extract the methanol away from the vinyl acetate with water extraction. This is possible because the vinyl acetate has an approximate solubility in water of 2.5% while methanol is totally soluble in water.

A series of extractions with water was set up in 100 mL mixing cylinders using various ratios of water and methanol/vinyl acetate mixture. The plan was to extract away as much methanol as possible and yet leave as much vinyl acetate behind as well. Too little water used will not separate the methanol from the vinyl acetate while too much water will solubilize both the methanol and vinyl acetate. The ratios used and the results found are listed in the table below.

Sample mL	Water mL	Top Organics mL
50	10	ND
50	20	ND
50	30	2.5
50	40	6.0
50	50	7.0

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

From the above table it can be seen that with a 50:50 mix the organics are still increasing from the extraction. A second set of extractions was set up to determine the final recommended ratios. These volume ratios are seen in the table below.

Sample mL	Water mL	Top Organics mL
40	40	6.0
40	50	6.1
40	60	6.1

From this table it can be seen that a mixture ratio of 40:50 or 40:60 recovers the same amount of vinyl acetate, as close as can be determined by this technique. Any further addition of water will not recover more methanol and will eventually solubilize all of the vinyl acetate as well. The decision was made to use the 40:50 ratios for the extraction to minimize water usage and maximize recoverable vinyl acetate as well.

The bottom phase (methanol, water, some vinyl acetate) of a 40:50 ratio extraction was then distilled to check for distillation range and any abnormalities or other phenomenon that would aid in processing this material in our plant. The distillation data from a 100 mL distillation is shown below.

Volume mL	OH Temp deg C	Pot Temp deg C
IBP	60	74
10	66	83
20	78	87
25	80	89
30	82	91
35	87	94
40	91	96
45	97	99

The distillation was taken to 99 deg C in the pot but if it is decided that less water should be taken over it can be cut back. For this testing the potential chemicals coming overhead wanted to be maximized without too much regard for water content.

The overhead distillate and the top neat organic phase from the extraction were sent to an outside lab for identification and quantitation by GC. Those results are summarized below.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Component	Distillate		Top Organic Layer	
wt%	Dry Basis	Wet Basis	Dry Basis	Wet Basis
Methanol	70.37	57.86	3.14	3.07
Vinyl Acetate	22.28	18.32	94.04	91.81
Methyl Acetate	3.62	2.98		
Others	3.73	3.06	2.82	2.75
water		17.78		2.37

The data shows that on a dry basis we can produce 70% + methanol in the distillate and produce in the extracted phase an approximate 94% concentration of vinyl acetate on a dry basis. The "others" are unknown peaks that eluted on the test lab GC that we not identified. Perhaps Noltex could shed some light on what these other components could be.

These type and quality of products should be able to be produced at CES. The most challenging will be the initial water extraction, which will take good mixing in order to extract the methanol into the water. Afterwards, the mixing vessel will need time to phase separate. The phase separation is clean with no rag layers and is easy to distinguish because of the color differences between the two. The top organic layer is then decanted and is ready for sale. The bottom water layer goes through a simple distillation only to remove water. The deeper the cut, the more water there will be removed and less chance of any organics remaining behind. It is simple and straight forward.

Conclusion/Recommendations

CES is in a good position to process this stream, which can be separated into the two mixtures detailed above. The process is straight forward and should be within the capability of both our equipment and personnel here at CES. We should move forward and strongly consider this processing scheme if the markets are there into which we can move these product lines.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Keli Lofton, Matt Moser, Joe Camp
Cc: Marlin Moser, Gary Peterson, Prabhaker

Date: 06/23/08

From: Miles Root

Lab Memo: 08-114

Subject: **Zach Evaluation 0608-47 – MeOH/Xylenes/MTBE/DMAD Stream**

A sample of hydrocarbon from Zach has been evaluated for processing at CES. This stream is to contain methanol, xylenes, MTBE (methyl tertiary butyl ether) and DMAD (dimethyl acetylene dicarboxylate). A water wash of this material will recover a wet methanol stream and a second stream that can be distilled to separate the MTBE and xylenes, if desired.

This material is another production run from Zach that will produce 2-3 trucks per week of this material while in this mode of operation.

Experimental testing indicates that a ratio of 70% material to 30% water will recover all of the extractable methanol while using the least amount of water. Using this ratio, a 23% methanol stream will result. This can be blended into any of our other methanol runs and the methanol recovered.

Using the measured density of the resulting water washed hydrocarbon layer of 0.7986 and densities from chemical tables for both mixed xylenes (0.87) and MTBE (0.74), it was estimated that the resulting stream contained approximately 65% MTBE and 36% xylenes. This is not exact, as the neat material is reported to contain less than 1% DMAD which was considered insignificant and not used in the calculations, and each of the three xylenes has a slightly different density. This resulting hydrocarbon containing this approximate mix may be blended into light ends or distilled to recover the components.

A lab distillation shows a recovery of approximately 69% MTBE and 31% xylenes. The boiling point of MTBE is 131 deg F and that of xylenes is approximately 280 deg F. Since xylenes are three separate isomers whose exact ratio is not known, this exact boiling point is a very close approximation. The MTBE comes over as very pale yellow in appearance and has a density of 0.739. Its endpoint is easy to determine since there is a drop in temperature. The xylenes were left in the distillation bottoms since there is a question as to whether our distillation unit can easily obtain the needed temperature. Also, they may be sold "as is", which is dark brown in appearance.

Both MTBE and xylenes are used as solvents. While MTBE is no longer used in this country as a fuel additive, it is still used in many overseas markets for this purpose. Xylenes are used in a variety of markets including paint thinners and varnishes, which may be an application for this material.

Overall, this evaluation sample analyzes to contain approximately 63% MTBE, 28% mixed xylenes, 9% methanol and is reported to contain less than 1% DMAD.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Keli Lofton, Gary Peterson, Prabhaker

Date: 06/17/08

From: Miles Root

Lab Memo: 08-106

Subject: **Citgo Corpus Christi Evaluations 0608-38 & 39**

Two samples of spent caustic from Citgo, Corpus Christi, TX have been tested for potential use in our sulfidic caustic business. These two samples are evaluations 0608-38 and 39. While both of these streams are spent caustic, one is very weak sulfidic and the second has no sulfides. They are not treatable with peroxide so we need outlets for material of this nature if we are going to accept it.

Evaluation 0608-38 is very dark green in appearance and shows by titration 7.8 wt% as NaOH. This sample contains 0.1 wt% sulfides and 0.2 wt% mercaptan sulfur. These are very low values for sulfidic caustic, and while technically this is a sulfidic caustic, it is of very low quality. This particular sample could not be treated with peroxide to remove its odor. If we have a market for weak sulfidic caustic, this will fit right in.

Evaluation 0608-39 is very dark brown in appearance and shows by titration 3.1 wt% as NaOH. There are no sulfides, 0.1 wt% mercaptan sulfur and its odor is very strong. This material does not treat with peroxide to eliminate its odor. This stream is no worse in quality than some of the Enterprise material we currently accept but we need a market outlet for material of this low quality.

We can accept material such as this from Citgo, must we need markets to move them into if we decide to do this.

Citgo, Corpus Christi TX		
	Eval 0608-38	Eval 0608-39
pH	12.1	12.2
Specific Gravity	1.115	1.05
NaOH, wt%	7.8	3.1
Sulfides, as S, wt%	0.1	0
RSH, as S, wt%	0.2	0.1
Solids, vol%	None	None

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Marlin Moser
Cc: Matt Bowman

Date: 01/11/08

From: Miles Root

Lab Memo: 08-004

Subject: **Phenolics in KMTEX Stripped Water**

A sample of water distilled from sulfidic caustic from KMTEX T-606 has been tested for phenolics by GC/MS to determine isomers and also total concentration. The total phenolics concentration is estimated to be 15,600 mg/L by GC/MS.

Testing/Discussion

A 100 mL sample of KMTEX T-606 dated 10/23/07 was used for the testing. This sample was said to be typical of material that would be concentrated. The sample was distilled from a 500 mL boiling pot and 50 mL was collected overhead. The stripping of the water represents only a simple distillation of the water, similar to what would be done at CES. A portion of the water was tested by the colorimetric method in house and found to be in the 10,000 to 12,000 mg/L range by this method.

A portion of the stripped water was sent to Texas Oil Tech for GC/MS analysis to identify and quantitate the phenolics. Their full report is attached. Total phenolics are estimated at 15,600 mg/L. This includes all of the identified isomers of phenol. Since only a few of the phenolics are typically quantitated for the standard 8270 method average response factors were used to quantitate the remaining phennolics. This is fine for our work, and also the isomer distribution shows that the majority of the phenolics consist of just a few isomers.

The para substituted phenolics, those with a "4" in their name, do not react in our colorimetric test method. I am sure that the 4-methyl phenol peak also contains the 3-methyl phenol as well, so this is actually two unresolved peaks on their GC/MS and I would estimate that around half of this value will show up in our colorimetric testing.

The Texas Oil Tech report is below.

Certificate of Analysis

SINCE 1985

Quality Controlled Through Analysis

10630 FALLSTONE RD. HOUSTON, TEXAS 77099
P.O. BOX 741905, HOUSTON, TEXAS 77274

TEL: (281) 495-2400
FAX: (281) 495-2410

CLIENT:	CES Environmental	**REQUESTED BY:**	Mr. Miles Root
SAMPLE:	0108-7	**REPORT DATE:**	January 11, 2008
LABORATORY NO:	48865 R	**PURCHASE ORDER NO:**	Pending

TEST **RESULTS**

Composition Breakdown, Gas Chromatography/Mass Spectrometer

The sample was analyzed on a gas chromatograph/ mass spectrometer. A library search was performed on the collected data using the Wiley 138 Library and the NIST 98 Library. Together the libraries contain approximately 200,000 compounds.

The sample was extracted with methylene chloride before analysis. These data are based on the chromatographable components found. If heavier compounds, high molecular weight additives or polymers are present these were not seen on the gas chromatograph/ mass spectrometer. The results have not been corrected for the water content.

Overall, the material appears to have the following tentative composition:

Tentatively Identified Compounds Types Found		Approximate Quantification Weight Percent
phenol		10.62
2-methyl phenol		29.32
4-methyl phenol		10.58
2-ethyl phenol		3.35
3-ethyl phenol		3.15
2,6-dimethyl phenol		4.13
2,4-dimethyl phenol		15.54
2,5-dimethyl phenol		2.39
2,3-dimethy phenol		2.90
3,5-dimethyl phenol		1.23
2-ethyl-5-methyl phenol		0.38
4-ethyl-3-methyl phenol		0.35
3-ethyl-5-methyl phenol		0.56
2-propyl phenol		0.27
3-propyl phenol		0.61
2,4,6-trimethyl phenol		0.50
2,3,5-trimethyl phenol		0.30
2,4,5-trimethyl phenol		0.28
3,4,5-trimethl phenol		0.13
isopropyl phenol		0.04
others		13.37
	Sub Total	100.00

The total concentration of phenols present has been estimated at 15,600 mg/L using the average total ion chromatogram (TIC) response factors from phenol, 2-methyl phenol, 4-methyl phenol and 2,4-dimethyl phenol. We do not have standards for the other phenols found, so it is only an estimate.

Respectfully submitted
For Texas OilTech Laboratories, L.P.

A. Phil Sorurbakhsh
Director of Laboratory Operations

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Cert. No. 5085

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Marlin Moser
Cc: Gary Peterson, Bo Cumberland

Date: 03/18/08

From: Miles Root

Lab Memo: 08-039

Subject: **Butanol Distillation and Recommendations**

A sample of butanol from trailer 8177 has been distilled to check for optimum cut off temperatures and processing options for the overhead distillate and pot bottoms. Results show that the pot bottoms will mix well with our black oil and that the overhead distillate will mix well with our light ends. The distillate cut will be approximately 15% of the charge and will require a pot temperature of approximately 259 deg F.

A 100 mL sample was distilled slowly in order to see what temperatures would be required for this run. The first 10% of the distillation produces a very light boiling material, suitable for blending with our light ends. It has an API gravity of around 39. Afterwards, the pot temperature will increase to around 259 deg F at which point the overhead temperature will be just under the boiling point of butanol at 244 deg F. The distillation may be stopped at this point, as the required cut has been completed. This distillate should represent approximately 15% of the charge volume.

The pot bottoms mixes well with our black oil and the distillate will blend with our light ends. There are no solids or any other issues with the distillation.

It was noted when the trailer sample was initially pulled that a fine suspension of particulates was present. These settled out overnight, leaving a reasonably clear butanol solution for distillation. These solids should be at the bottom of trailer 8177.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Marlin Moser, Bo Cumberland, Gary Lenertz
From: Miles Root

Date: 01/07/08
Lab Memo: 08-002

Subject: **Laboratory Distillation - Methylene Chloride/Methanol Mixture**

A sample of our methylene chloride/methanol mixture from trailer 225 dated 01/03/08 has been distilled in the laboratory to help determine plant operating parameters. Azeotropic data from a handbook has indicated that an azeotrope that forms with these two chemicals can produce a product that contains approximately 93% methylene chloride and 7% methanol. Whether this can be done in our field unit is yet to be determined, but the following information can be used to help maximize our purity.

Lab Testing/Observations

A laboratory distillation was set up consisting of a boiling pot, fractionation column, condenser and receiving pot. The fractionation column used was a Vigreux column which consists of a column of glass with numerous indentations in the glass wall. This assists in the contact time needed for refluxing within the column. The overhead temperature was also set up to be monitored as well.

The azeotrope handbook indicates an azeotrope forming with these two components at 37.8C (100F) which is below the boiling point of methylene chloride (40C/104F) and methanol (64.65C/148.4F). This azeotrope is to contain 92.7% methylene chloride and 7.3% methanol.

A charge of 200 mL was used. The distillation overhead take off temperature was monitored closely and the pot temperature noted. The distillation was done slowly to maximize the concentration of methylene chloride by avoiding any flashing of the material. The pot temperature was not used for determining the cuts but rather the overhead temperature. The pot temperature was noted to begin around 52C and move up to 65C once the methylene chloride had distilled off. The pot temperature was increased to 84C at the end of the distillation just to distill away most of the pot material.

The distillation was allowed to proceed with four cuts being isolated for density determinations. The first and second cuts were taken randomly to determine the density of the product. The third cut was taken after the temperature was allowed to rise and equilibrate to a new overhead temperature. The temperature moved up fairly quickly from around 40 to 62C. The remaining distillation overhead temperature remained steady at 65C (149F). Recovered pot bottoms were 3 mL for a total balance of 189 mL vs. 200 mL charge.

Overhead Temp Deg C	Density	Volume, mL
39.5	1.250	13
37.5	1.260	30
40 - 62	1.103	49
65	0.795	94

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Discussion/Recommendations

The listed densities for methylene chloride and methanol are 1.327 and 0.791 respectively. I don't know how "additive" the densities are for these two compounds when mixed together, but the data does not show that they follow a normal averaging. That is to say, you can't just take 90% of the methylene chloride and 10% for the methanol densities and add them together to get a purity measurement for the mixture.

The measured densities of 1.25 – 1.26 for the first portion of the distillation represents the best cut for the azeotrope for the two components. This will maximize our methylene chloride concentration. We can use these values as a guide in the field to let us know if the unit is producing a "good" product. The transition which moved the overhead temperature up to 62C is where the methylene chloride has been totally distilled over leaving only the methanol in the still. Once the 65C temperature is reached this material is the purest form of methanol that we will see. You will note that the measured density of 0.795 is very close to the literature value of 0.791. Our feed contains an overabundance of the methanol so we will always see this phenomenon. If desired, I can repeat the testing and only make a single cut when I see the overhead temperature rise to above 42C to insure that the methylene chloride has been distilled over with the azeotrope. This would be a good indicator of the ratio amounts of the two products we could expect to see in any given run.

The key to good field operation will be monitoring of the overhead temperature and a packing material that will allow fractionation to occur as well as it possibly can. The condenser unit in the lab also allows the overhead product to drain down at an angle that always evacuates the condenser and makes it ready for new product. Since our field unit has very low plates we must maximize its separation capabilities everywhere we can. High still temperatures will only serve to "flash" over the mixture and not even allow a good azeotrope to form.

The sudden rise in temperature in the overhead product is the indicator we should use that the methylene chloride concentration is rapidly decreasing and that the methanol is now concentrating up. Remember that the boiling point of methylene chloride is 40C As the temperature moves from 40C to 65C the methanol concentration is rapidly is increasing as well.

Following these guidelines will help us to produce the best two product mixes that we can.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman, Joy Baker
Cc: Gary Lenertz, Marlin Moser, Bo Cumberland

Date: 01/24/08

From: Miles Root

Lab Memo: 08-010

Subject: **Noltex Methanol/Vinyl Acetate Stream - Sample Evaluation 0108-29**

A sample from Noltex on Strang Road containing a mixture of methanol and vinyl acetate has been evaluated for potential processing at CES. This mixture has good potential for recovering a stream of 70% + of methanol and a second stream of 90% + vinyl acetate

Experimental/Discussion

This stream contains of at least methanol, vinyl acetate, and methyl acetate, along with some other unknown species. Since this mixture contained both methanol and vinyl acetate, a plan was proposed to extract the methanol away from the vinyl acetate with water extraction. This is possible because the vinyl acetate has an approximate solubility in water of 2.5% while methanol is totally soluble in water.

A series of extractions with water was set up in 100 mL mixing cylinders using various ratios of water and methanol/vinyl acetate mixture. The plan was to extract away as much methanol as possible and yet leave as much vinyl acetate behind as well. Too little water used will not separate the methanol from the vinyl acetate while too much water will solubilize both the methanol and vinyl acetate. The ratios used and the results found are listed in the table below.

Sample mL	Water mL	Top Organics mL
50	10	ND
50	20	ND
50	30	2.5
50	40	6.0
50	50	7.0

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

From the above table it can be seen that with a 50:50 mix the organics are still increasing from the extraction. A second set of extractions was set up to determine the final recommended ratios. These volume ratios are seen in the table below.

Sample mL	Water mL	Top Organics mL
40	40	6.0
40	50	6.1
40	60	6.1

From this table it can be seen that a mixture ratio of 40:50 or 40:60 recovers the same amount of vinyl acetate, as close as can be determined by this technique. Any further addition of water will not recover more methanol and will eventually solubilize all of the vinyl acetate as well. The decision was made to use the 40:50 ratios for the extraction to minimize water usage and maximize recoverable vinyl acetate as well.

The bottom phase (methanol, water, some vinyl acetate) of a 40:50 ratio extraction was then distilled to check for distillation range and any abnormalities or other phenomenon that would aid in processing this material in our plant. The distillation data from a 100 mL distillation is shown below.

Volume mL	OH Temp deg C	Pot Temp deg C
IBP	60	74
10	66	83
20	78	87
25	80	89
30	82	91
35	87	94
40	91	96
45	97	99

The distillation was taken to 99 deg C in the pot but if it is decided that less water should be taken over it can be cut back. For this testing the potential chemicals coming overhead wanted to be maximized without too much regard for water content.

The overhead distillate and the top neat organic phase from the extraction were sent to an outside lab for identification and quantitation by GC. Those results are summarized below.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Component	Distillate		Top Organic Layer	
wt%	Dry Basis	Wet Basis	Dry Basis	Wet Basis
Methanol	70.37	57.86	3.14	3.07
Vinyl Acetate	22.28	18.32	94.04	91.81
Methyl Acetate	3.62	2.98		
Others	3.73	3.06	2.82	2.75
water		17.78		2.37

The data shows that on a dry basis we can produce 70% + methanol in the distillate and produce in the extracted phase an approximate 94% concentration of vinyl acetate on a dry basis. The "others" are unknown peaks that eluted on the test lab GC that we not identified. Perhaps Noltex could shed some light on what these other components could be.

These type and quality of products should be able to be produced at CES. The most challenging will be the initial water extraction, which will take good mixing in order to extract the methanol into the water. Afterwards, the mixing vessel will need time to phase separate. The phase separation is clean with no rag layers and is easy to distinguish because of the color differences between the two. The top organic layer is then decanted and is ready for sale. The bottom water layer goes through a simple distillation only to remove water. The deeper the cut, the more water there will be removed and less chance of any organics remaining behind. It is simple and straight forward.

Conclusion/Recommendations

CES is in a good position to process this stream, which can be separated into the two mixtures detailed above. The process is straight forward and should be within the capability of both our equipment and personnel here at CES. We should move forward and strongly consider this processing scheme if the markets are there into which we can move these product lines.

PRECISION PETROLEUM LABS, INC.

5915 Star Lane Houston, TX 77057
Ph. 713-680-9425 Fax: 713-680-9564

CERTIFICATE OF ANALYSIS

Company:	CES Environmental Services, Inc
Invoice No.:	36239
Lab Reference No.:	2008-01-563
Product ID:	Sample ID-0108-43 01-21-08
Date Received:	01-21-2008
Authorized By:	Miles Root

Parameter	**Test Method**	**Results**
Water by K.F. Wt%	D-1744	2.37

GAS CHROMATOGRAPHY, WT%	**Dry Basis Results**	**Wet Basis Results**
Methylene Chloride	< 0.01	< 0.01
Methanol	3.14	3.07
Vinyl Acetate	94.04	91.81
Others	2.82	2.75

Daniel Zabihi
QA Manager
Date: 01-22-2008

PRECISION PETROLEUM LABS, INC.

5915 Star Lane Houston, TX 77057
Ph. 713-680-9425 Fax: 713-680-9564

CERTIFICATE OF ANALYSIS

Company:	CES Environmental Services, Inc
Invoice No.:	36239
Lab Reference No.:	2008-01-562
Product ID:	Sample ID-0108-42 01-21-08
Date Received:	01-21-2008
Authorized By:	Miles Root

Parameter	Test Method	Results
Water by K.F. Wt%	D-1744	17.78

GAS CHROMATOGRAPHY, WT%	Dry Basis Results	Wet Basis Results
Methylene Chloride	< 0.01	< 0.01
Methanol	70.37	57.86
Vinyl Acetate	22.28	18.32
Methyl Acetate	3.62	2.98
Others	3.73	3.06

Daniel Zabihi
QA Manager
Date: 01-22-2008

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker, Matt Bowman
Cc: Gary Lenertz
From: Miles Root

Date: 01/17/08

Lab Memo: 08-007

Subject: **Noltex Sample Evaluation 0108-29 - Methanol Mixture**

A sample from Noltex, Strang Rd, has been evaluated as a potential incoming feed stream for processing. This is evaluation sample 0108-29. Overall, this sample has a distillation range that is too narrow for us to fractionate out the organics except for the heavier boiling ethylene vinyl alcohol. The distillation of this stream does produce a product that is water white in appearance and could go into a mixed solvents end use.

A simple laboratory distillation was set up and run on the Noltex sample. This sample is an unknown percentage mixture of at methanol, methyl acetate, ethylene vinyl acetate and ethylene vinyl alcohol. The initial boiling point was 58 deg C with a pot temperature of 63 deg C. The end point temperature was 69 deg C with a pot temperature of 86 deg C. The pot contained a dark amber looking material that was easily cleaned up. At no point during the distillation was there a leveling off of the temperature that could be considered a break. The temperature rose slowly and gradually over time until the end point. Our distillation unit will not be able to fractionate away any of the methanol from this mixture, and we will essentially be making a slop cut to remove the heavies.

The distillate has a flash point of < 70 deg F and a density of 0.833 at ambient temperature. If we have a market for this distillate material it will look water white in appearance and be free of any particulates.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Kelli Lofton, Gary Peterson, Prabhaker

Date: 06/30/08

From: Miles Root

Lab Memo: 08-118

Subject: **Solvay Evaluation 0608-54**

A sample of water from Solvay has been evaluated for potential processing at CES. This sample is evaluation 0608-54 and is neutralized waste water from cleaning tanks with nitric acid, HF and caustic. Overall, this water is acceptable for processing at CES and has no real issues other than a slightly elevated nickel content that can be handled.

This sample is neutral with a pH of 7 and contains no solids. The water treats easily and has a nice solids formation and phase separation upon treating. The TOC is low at 1275 ppm, there are no phenols, and the metals are acceptable. A minimum charge of $.12/gallon should be acceptable for us to make money on this stream.

The table below summarizes the test results.

Solvay Evaluation 0608-54	
Neat Sample	
pH	7
Solids, vol%	0
Treated	
Oils, vol%	0
TOC, ppm	1275
Phenols, ppm	0
Metals, ppm	
Cd	0.032
Cr	0.067
Cu	0.210
Ni	2.113
Zn	0.041

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Kelli Lofton, Gary Peterson, Prabhaker

Date: 06/30/08

From: Miles Root

Lab Memo: 08-117

Subject: **Phoenix Pollution Control Evaluations 0608-52**

A sample of oily water from Phoenix Pollution Control has been evaluated for potential processing at CES for oil recovery. This sample is evaluation 0608-52 and is gums from canola oil feedstock and water used in the manufacturer of biodiesel. Overall, the oil from this stream can be recovered and appears to be of very good quality.

This sample was treated with heat, sulfuric acid and emulsion breaker to obtain a good phase separation of the oil. The sample needed to be heated to boiling in order to get a good separation, as low heat just didn't seem to work. Phase separation without the use of an emulsion breaker was also very slow and not as clean. This sample contained approximately 62% oil by volume. The oil is medium amber in appearance and clear. All of its test results look very good. Chlor-d-tect is 500 mg/L, ash is 0.01 wt%, API is 24 and the viscosity @ 40 deg C is 26 cSt.

The water from treatment has a low TOC of 2557 ppm, no phenols, and acceptable metals other than the nickel, which is 3.8 ppm. We will need to dilute this water for discharge.

We should pursue acquisition of this material. Pricing will depend upon what this oil is worth in the marketplace. The table below summarizes the analytical testing.

Phoenix Pollution Control	
Evaluation 0608-52	
Neat Sample	
pH	10
Treated Water	
Phenols, ppm	0
TOC, ppm	2557
Metals	
Cd	0.068
Cr	0.072
Cu	0.134
Ni	3.788
Zn	0.241
Oil Testing	
API	24
Chlor-d-tect, mg/L	500
Viscosity @ 40 deg C	26 cSt
Ash, wt%	0.01
Oil Recovery, vol%	62

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson
Cc: Kelli Lofton, Gary Peterson, Prabhaker

Date: 06/25/08

From: Miles Root

Lab Memo: 08-116

Subject: **Grant Prideco Evaluations 0608-50 & 51**

Two samples consisting of an oily sludge and a waste coolant from Grant Prideco, Navasota, TX have been evaluated for processing at CES. These two samples are evaluations 0608-50 and 0608-51. These samples come from a pit cleanout and are the result of a trepanning operation. Trepanning is just a type of machining and these are probably cooling and lubricating oils used in their process. We can accept both streams with the oily sludge to be processed on site and the coolant going to System 1.

Evaluation 0608-50 is an oily sludge that must be treated with heat and emulsion breaker in order to see any type of oil separation. The majority of the sample is sludge and I estimate the oil to be no more than 10% of this particular sample. Joe Wilson indicated that this was a "better" sample than what we would probably see and that Grant Prideco was skimming off as much oil as they could for recovery. The oil that I recovered from this sample has a chlor-d-tect value of 200 mg/L. We can bring this material in and process it through our heat tank and then centrifuge to recover any oil.

Evaluation 0608-51 is a weak ethylene glycol solution of approximately 8% strength. The sample is rather murky and pale brown in appearance. We cannot treat ethylene glycol and discharge it to the city sewer due to the very high TOC we will have. This is a good candidate for our System 1 processing.

We can accept both of these streams. The oily sludge we will process at CES, the coolant stream will be sent to System 1.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Keli Lofton, Dan Bowman
Cc: Gary Peterson, Prabhaker

Date: 06/25/08

From: Miles Root

Lab Memo: 08-115

Subject: **Heritage Interactive/Ball Oil Evaluation 0608-49**

A sample of oil from Heritage Interactive that was purchased from Ball Oil has been evaluated for purchase by CES. This sample is evaluation 0608-49 and is oil used in the manufacture of cans. Overall, this oil is clean looking with very low ash. It was noted for the record that this sample was actually taken by the vendor and not a CES sales representative.

This oil is medium brown in appearance and has a water content of 1142 ppm, so it is slightly cloudy. Analysis for this oil shows the ash is 0.06 wt%, API gravity is 30, flash point is greater than 140 deg F with a chlor-d-tect of 500 gm/L. There are no abnormalities noted with this sample. The table below summarizes the analytical data.

Heritage/Ball Oil Evaluation 0608-49	
API	30
Water, ppm	1142
Ash, wt%	0.06
Flash Point, deg F	> 140

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Keli Lofton, Gary Peterson, Prabhaker

Date: 06/23/08

From: Miles Root

Lab Memo: 08-113

Subject: **Rineco Evaluation 0608-46**

A sample of waste water from Rineco, generated by NuStar has been evaluated for processing at CES. This sample is evaluation 0608-43 and is stated to be oily rinse water from a tank. Overall, this water looks good for processing and should present minimal handling issues.

This sample does have a few drops of what appear to be oil on top of the water. There is not enough to even call it an oil sheen. Upon treating, these drops of oil are no longer visible. A spinout of this material with a centrifuge does not show any oil layer. Flash point on this sample is greater than 140 deg F. It does have a dark brown appearance when shaken, but the water becomes clear when allowed to sit and the 5% solids are allowed to settle out. There are no phenols and the metals and TOC are low. The water treats easily with our standard treat and we should have no issues. While the sample does have a peculiar odor, it is not particularly offensive and should require no special handling.

Pricing should be at least $0.12/gal to cover basic costs with an additional $0.04/gal for solids. The table below summarizes the analytical testing.

Rineco Evaluation 0608-46	
Neat Sample	
pH	7
Solids, vol%	5
Treatability	Easy
Flash Point, Deg F	>140
Oil,vol%	Trace
Treated Sample	
TOC, mg/L	2251
Phenols, ppm	0
Metals	
Cd	0.030
Cr	0.008
Cu	0.099
Ni	0.512
Zn	0.023

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson, Matt Bowman
Cc: Keli Lofton, Gary Peterson, Prabhaker

Date: 06/25/08

From: Miles Root

Lab Memo: 08-112A

Subject: **Ace/AmRep Evaluation 0608-41- Updated**

A sample of waste water from Ace/AmRep has been evaluated for processing at CES. This sample is evaluation 0608-41 and will have incoming profile codes D001 and F003 for ignitability. This water comes from a floor scrubbing operation at a chemical plant so it literally will contain whatever was cleaned off the floors at the time. Essentially it is an aqueous stream with some detergent and chemicals. It will not be consistent from one load to the next. The expected frequency of this material is one trailer load every six weeks. We can handle this type of material when treated properly, and pricing should be at least in the low twenty cents per gallon range.

The neat sample has a pH of 10, a flash point of 130 deg F, and has a pale milky purplish appearance. Heating this sample on a hot plate removes the low flash point characteristics but forms a plastic type of film on the surface. This is a polymer type material that sets up with heat. This is not a thick hard plastic material such as we see with Evalca, but it is a material that will need to be cleaned from a heating tank once it is processed. Possibly mixing this load with others in the back heat tank will reduce this formation. There is no oil that we will recover from this source.

The heated water treats easily but forms a spongy type of solids that will need to be filtered out. The solids that are formed separate easily from the water, it's just that they will be spongy. Both Godefroy and Rolando looked at this spongy material and agreed that it was something that we could handle. The water looks good after treatment and has low phenols and moderate TOC. It is high in both Ni and Zn. It's not too high that we cannot dilute with other good water as we have done with other streams many times.

Overall, this material can be processed with some work. The fact that we can remove the low flash means that we can handle any solids produced as regular waste and not as a hazardous waste. The table below summarizes the analytical testing on this source.

Addendum – Added on 06/25/08 from additional work

Additional testing on this sample shows it will produce 21 wt% solids from our standard treat. Good mixing action will help to keep the solids from forming large solid blocks and aid in its filtration. The solids do filter easily and the resulting water is slightly tinted but clear. A 50/50 mix with water will cause the flash point to become greater than 140 deg F. The looks of this diluted sample are not good and it retains its milky purple appearance. Metals on the untreated sample are very high in zinc, at 11 ppm. The TOC on the untreated sample are 51,500 ppm. Also, the solids produced from this treat should not carry the F003 waste code if due to ignitability.

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4904 Griggs Road
Houston, TX 77021
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I again recommend that we accept this stream and process it through our heat tank in the back. This will remove any of its ignitability characteristics. The solids then produced from our standard water treat will go out in our class 2 bins without issue.

The table below has been updated to summarize the completed work on this sample.

Ace/AmRep Evaluataion 0608-41	
Neat Sample	
TOC, mg/L	51500
pH	10
Solids from treat, wt%	21
Flash Point, Deg F	130
50/50 Water/Sx FP	>140
Oil, vol%	0
Metals	
Cd	0.045
Cr	2.023
Cu	0.658
Ni	1.718
Zn	11.2
Treated Sample	
TOC, mg/L	8550
Phenols, ppm	2
Flash Point, Deg F	>140
Metals, ppm	
Cd	0.135
Cr	0.262
Cu	0.253
Ni	5.06
Zn	7

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson
Cc: Keli Lofton, Gary Peterson, Prabhaker

Date: 06/19/08

From: Miles Root

Lab Memo: 08-112

Subject: **Ace/AmRep Evaluation 0608-41**

A sample of waste water from Ace/AmRep has been evaluated for processing at CES. This sample is evaluation 0608-41 and will have incoming profile codes D001 and F003 for ignitability. This water comes from a floor scrubbing operation at a chemical plant so it literally will contain whatever was cleaned off the floors at the time. Essentially it is an aqueous stream with some detergent and chemicals. It will not be consistent from one load to the next. The expected frequency of this material is one trailer load every six weeks. We can handle this type of material when treated properly, and pricing should be at least in the low twenty cents per gallon range.

The neat sample has a pH of 10, a flash point of 130 deg F, and has a pale milky purplish appearance. Heating this sample on a hot plate removes the low flash point characteristics but forms a plastic type of film on the surface. This is a polymer type material that sets up with heat. This is not a thick hard plastic material such as we see with Evalca, but it is a material that will need to be cleaned from a heating tank once it is processed. Possibly mixing this load with others in the back heat tank will reduce this formation. There is no oil that we will recover from this source.

The heated water treats easily but forms a spongy type of solids that will need to be filtered out. The solids that are formed separate easily from the water, it's just that they will be spongy. Both Godefroy and Rolando looked at this spongy material and agreed that it was something that we could handle. The water looks good after treatment and has low phenols and moderate TOC. It is high in both Ni and Zn. It's not too high that we cannot dilute with other good water as we have done with other streams many times.

Overall, this material can be processed with some work. The fact that we can remove the low flash means that we can handle any solids produced as regular waste and not as a hazardous waste. The table below summarizes the analytical testing on this source.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Ace/AmRep Evaluataion 0608-41	
Neat Sample	
pH	10
Flash Point, Deg F	130
Oil, vol%	0
Treated Sample	
TOC, mg/L	8550
Phenols, ppm	2
Flash Point, Deg F	>140
Metals, ppm	
Cd	0.135
Cr	0.262
Cu	0.253
Ni	5.06
Zn	7.00

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Keli Lofton, Gary Peterson, Prabhaker

Date: 06/19/08

From: Miles Root

Lab Memo: 08-111

Subject: **Martin Transport Evaluation 0608-42**

A sample of oil from Martin Transport has been evaluated as marketable oil. The sample is evaluation 0608-42 and represents approximately 6000 gallons of material.

This oil has no water detected by our Dexsil Hydro Scout method. The ash is high at 1.8 wt%. Viscosity was determined at 40 deg C and is reported in centistokes which are abbreviated as cSt. This oil is free of particulates or sludge and is dark amber in appearance and nearly clear. The analytical work performed on this sample is summarized below.

Martin Transport	
Evaluation 0608-42	
API	27.2
Ash, wt%	1.9
Viscosity, cSt, @ 40C	102
appearance	Dark amber
chlor-d-tect, mg/L	500
water, ppm	0

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Keli Lofton, Gary Peterson, Prabhaker

Date: 06/19/08

From: Miles Root

Lab Memo: 08-110

Subject: **Valero Evaluation 0608-43**

A sample of sulfidic caustic from Valero, Houston has been evaluated for processing at CES. This sample is evaluation 0608-43. Overall, this is a very weak sulfidic caustic that may be processed at CES to recovery the small amount of sulfides.

A composite of a top, middle and bottom sample was prepared and analyzed. This sample is a very weak caustic with corresponding weak sulfide content, and no mercaptan sulfur. Our potential treatment would consist of acidification to recovery the hydrogen sulfide. This would be run in our SIB tank system. Since we will produce very little hydrogen sulfide from this stream for the work involved we need to make sure we are covering our costs for disposal. The table below summarizes the analytical work.

Valero Eval 0608-43	
Specific Gravity	1.025
NaOH, wt%	1.2
Sulfide, as S, wt%	0.15
RSH, as S, wt%	0

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Services, Inc.

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Houston, TX 77021
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Fax. (713) 676-1676

To: Joy Baker
Cc: Keli Lofton, Gary Peterson, Prabhaker

Date: 06/17/08

From: Miles Root

Lab Memo: 08-109

Subject: **Rineco Evaluation 0608-40**

A sample of water from Rineco has been evaluated for processing at CES. This sample is evaluation 0608-40 and is mop water/oily water from the rinsing of oil tanks. Overall, this sample is treatable water that will have a partial oil sheen and can be processed without issues.

This sample has a partial oil sheen with a flash point greater than 140 deg F. When treated, the oil is no longer visible. The sample easily treats with no issues, has no phenols, low TOC and acceptable metals. This stream is approximately 5000 gallons. The table below summarizes the analytical results.

Rineco Evaluation 0608-40	
pH	7
Solids, vol%	0.1
Phenols, ppm	0
TOC, mg/L	1475
Flash Point, deg F	>140
Metals	
Cd	0.104
Cr	0.173
Cu	0.222
Ni	1.006
Zn	0.112

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Keli Lofton, Gary Peterson, Prabhaker

Date: 06/17/08

From: Miles Root

Lab Memo: 08-108

Subject: **NC Precision Evaluation 0608-23**

A sample of spent glycol and oil from NC Precision has been evaluated for use at CES. This sample is evaluation 0608-23 and is produced from machining operations.

This sample contains an oil layer of approximately 30%. This oil fails the chlor-d-tect test with a value of over 4000 mg/L. This high value cannot be accepted by rebuttal, so this material will not be acceptable to bring in to CES for recovery. The total potential quantity for this stream was approximately four drums.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Keli Lofton, Gary Peterson, Prabhaker

Date: 06/17/08

From: Miles Root

Lab Memo: 08-107

Subject: **Midstates Environmental Evaluation 0608-37**

A sample of bleach from Midstates Environmental has been evaluated for use at CES. This sample is evaluation 0608-37 and is a sodium chlorite solution used as a bleaching solution.

The main application of sodium chlorite is the generation of chlorine dioxide for bleaching and stripping of textiles, pulp, and paper. Sodium chlorite is a strong oxidizer. The specific gravity of this sample is 1.205 at ambient temperature which equates to an approximate strength of 25% sodium chlorite. The www.oxy.com web site has lots of useful information about sodium chlorite and other bleaching chemicals that I used as a reference. The 25% solution is a standard solution that is sold. Marketing this material is one outlet that we have for this stream.

We can use some of this material in our wastewater plant but not an entire load at one time, due to the strong oxidizing effect of sodium chlorite. It readily reacts with organics and may generate excessive heat if processed into our system in one concentrated batch. We cannot receive a load of this material and process it as one batch into our system. We could move it into one of our frac tanks and process it through over a 24 hour period into our waste water. There is no treatment that we will actually do with this stream, it's just a matter of moving it through our waste water treatment system at a pace that it can handle.

Marketing this material to generators of chlorine dioxide will be more profitable. Otherwise, we will just have to process this material at an acceptable pace when it is received.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Keli Lofton, Gary Peterson, Prabhaker

Date: 06/11/08

From: Miles Root

Lab Memo: 08-105

Subject: **Flow Tech Evaluation 0608-25**

Two samples of material from Flow Tech, Waller, TX have been tested for flash point. These two samples are evaluation 0608-25 and represent two totes of material. Both of these totes appear to be some type of polymer. Both totes have flash points less than 80 deg F. This was the only testing requested on these samples.

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Houston, TX 77021
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To: Dan Bowman
Cc: Keli Lofton, Gary Peterson, Prabhaker

Date: 06/11/08

From: Miles Root

Lab Memo: 08-104

Subject: **CKG Magnolia County Evaluation 0608-26**

A sample of oil from CKG, Magnolia County has been tested for sales potential. This sample is evaluation 0608-26 and its source is from accumulated oil returns. This material looks and smells just like used motor oil. It does contain some sludge that would need to be processed out in our centrifuge, but that will not be an issue. The chlor-d-tect is 1700 mg/L, which means we will need a rebuttal from the supplier. The flash point is greater than 140 deg F. I do not know the potential volume for this source but should definitely pursue the acquisition of this material for sale into our black oil market.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Keli Lofton, Gary Peterson, Prabhaker

Date: 06/10/08

From: Miles Root

Lab Memo: 08-103

Subject: **EMA Evaluations 0608-17 and 18**

Two samples of material from EMA (Environmental Management Alternatives), St. Louis, MO have been evaluated as potential receipts for CES. Evaluation 0608-17 is a mix of isopropyl alcohol and another light solvent which comes from a tolling operation of mainly flammable liquids. Evaluation 0608-18 is a hazardous waste with numerous waste codes that are detailed below.

Evaluation 0608-17 is a two phased sample. The top layer is about one third of the sample. The MSDS sheet indicates Speer Products, Memphis, TN is the generator of this material. There is a potential of 15 totes per year of this material. The bottom phase is IPA and the top is another solvent of unknown composition. There is a rag layer containing a small amount of solids between the two layers. The bottom phase also has some solids, less than 1%.

The top phase has a peculiar odor that permeates the entire sample, including the IPA. The bottom phase has a density of 0.795 and is cloudy and tinted in appearance. Literature shows a density of 0.786 for pure IPA, showing that there is some water in this phase. A distillation of the bottom IPA layer cleans up this material nicely to a water white appearance but it continues to have a non IPA odor. This distillation also has a recovery of only 76% before it reaches its smoke point (the point at which smoke fills the flask to where one cannot see through it). The distillation does confirm as much as possible the fact that the bottom is indeed IPA, due to the boiling point. Literature shows that the azeotrope formed with water may produce a product containing 87.9% IPA and 12.1% water. We will need a market for IPA with a non-typical odor in order to move this material. This stream is also only 15 totes/year, so our outlets will need to accept small volumes of IPA.

The top phase of this sample has the peculiar odor. It mixes well with light ends and would need to go into that market. It is tinted in appearance but clear. Its density is 0.781. The MSDS sheet indicates that this is a two phased sample but gives no indication as to what this top phase might be.

Evaluation 0608-18 is hazardous waste wash water. The MSDS sheet indicates Virbacus, Bridgeton, MO as the generator of this material. While the MSDS sheet indicates that this is a two phased stream, organic and water phase, the sample I received has only a water phase. This material is generated from spills and wash cleanup from line flushing in manufacturing of animal feed products and other similar products. The potential receipt for this material is 5000 gallons/month.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

The waste codes are summarized as follows: toxic metals – D004 (As), D009 (Hg); toxic organics – D022 (chloroform), D035 (MEK), D040 (trichloroethylene); F codes – F002, F003 and F005. It is also characterized as D001 ignitable and carries the DOT shipping name Waste, Flammable Liquid, NOS. I tested this particular sample to have a flash point of less than 90 deg F and the MSDS sheet indicates it may range from 73 to 140 deg F.

While this material has toxic metals waste codes for both As and Hg, the accompanying analytical data from the supplier does not show these constituents to be out of alignment in concentration. It was also noted that the analytical data generated for the MSDS shows the sample to be non-conforming in pH, with a range given of 4-11 and a listed pH of 3.08.

Processing of this material would cause any solids generated or washings from tanks cleaned from containing this material to also carry the "F" codes. While the water does treat well and has a TOC of 35,260 mg/L and acceptable metals, this material cannot be processed at our facility. Deep well injection by a firm capable of handling hazardous waste is our only viable option.

CES Environmental Services, Inc.
4904 Griggs Road, Houston, TX 77021
Phone: (713) 676-1460 Fax: (713) 676-1676
http://www.cesenvironmental.com
TCEQ Industrial Solid Waste Permit Number: 30948
U.S. EPA ID Number: TXD008950461 ISWR Number: 30900

SECTION 1: Generator Information

Company: Speer Products Aka (Shiclo Inc)
Address: 4242 BF GoodRich Blvd.
City: Memphis State: TN Zip: 38118
Contact: Pete Dunn Title: ENVIRONMENTAL Mgr.
Phone Number: 901-362-1950 Fax Number: 901-795-9525
24/hr Phone Number: 901-362-1950
US EPA ID No: TND034793893
State ID No: SIC Code: 2842

SECTION 2: Billing Information - ☐ Same as Above

Company: EMA, INC.
Address: 10627 MIDWEST INDUSTRIAL Blvd.
City: St. LOUIS State: MO Zip: 63132
Contact: TIM HYLLA Title: VICE PRESIDENT
Phone Number: 314-518-9183 Fax Number: 314-785-6426

SECTION 3: General Description of the Waste

Name of Waste: ISOPROPYL Alcohol
Detailed Description of Process Generating Waste:
Tolling operation Mainly Flammable Liquids

Physical State: ☒ Liquid ☐ Sludge ☐ Powder ☐ Solid ☐ Filter Cake ☐ Combination

Color: clear to cloudy Odor: IPA solvent

Specific Gravity (water=1): .790 Density: 0.80 lbs/gal

Does this material contain any total phenolic compounds? ☐ Yes ☒ No

Does this material contain any para substituted phenolic compounds? ☐ Yes ☒ No

Is the Waste subject to the benzene waste operation NESHAP? (40 CFR Part 61, Subpart FF) ☐ Yes ☒ No
Answer "Yes" if your waste contains benzene **AND** if the SIC code from your facility is one of the following:

2812	2813	2816	2819	2821	2822	2823	2824	2833	2834
2835	2836	2841	2842	2843	2844	2851	2861	2865	2869
2873	2874	2876	2879	2891	2892	2893	2896	2899	2911
3312	4953	4959	9511						

Layers: ☐ Single-phase ☒ Multi-phase (2)

Container Type: ☐ Drum ☒ Tote ☐ Truck ☐ Other (explain)

Frequency: ☐ Weekly ☐ Monthly ☐ Yearly ☐ One-Time
Quantity: 15 totes per year (275 gallons

Is this a USEPA "Hazardous Waste" per 40CFR 261.3? ☐ Yes ☐ No

If "Yes", then please complete, sign and date the Underlying Hazardous Constituents Form attached hereto

If "Yes", Is it: ☐ D001 (Ignitable) ☐ D002 (Corrosive) ☐ D003 (Reactive)

Characteristic for Toxic Metals: ☐ D004 ☐ D005 ☐ D006 ☐ D007 ☐ D008 ☐ D009 ☐ D010 ☐ D011

Characteristic for Toxic Organics: D012 thru D043 (please list all that apply) ____________________

Is this an "F" or "K" Listed waste or mixed with one? ☐ Yes ☒ No

If "Yes", then please list ALL applicable codes: ____________________

Is this a commercial product or spill cleanup that would carry a "U" or "P" waste code under 40 CFR 261.33(e) or (f)? ☐ Yes ☒ No

If "Yes", then please list ALL applicable codes: ____________________

Texas State Waste Code Number: ____________________

Proper US DOT Shipping Name: Isopropanol

Class: 3 **UN/NA:** II **PG:** II **RQ:** ______

UN1219

Flash Point		pH		Reactive Sulfides		Reactive Cyanides		Solids	
<140		5 to 9		0	mg/l	0	mg/l	<1	%
Oil & Grease		**TOC**		**Zinc**		**Copper**		**Nickel**	
0	mg/l	0	mg/l	0	mg/l	0	mg/l	0	mg/l

SECTION 4: Physical and Chemical Data

COMPONENTS TABLE	CONCENTRATOIN	UNITS
The waste consists of the following materials	Ranges are acceptable	or %
IPA	75 - 80	
Water	25 - 15	
Dirt	<1	

SECTION 5: Safety Related Data

If the handling of this waste requires the use of special protective equipment, please explain.

SECTION 6: Attached Supporting Documents

List all documents, notes, data and/or analysis attached to this form as part of the waste approval package.

SECTION 7: Incompatibilities

Please list ALL incompatibilities (if any):

None

SECTION 8: Generator's Knowledge Documentation

Laboratory analysis of the hazardous waste characteristics, listed below, **WAS NOT PERFORMED** based upon the following generator knowledge:

TCLP Metals:
TCLP Volatiles:
TCLP Semi-Volatiles:
Reactivity:
Corrosivity:
Ignitability:

SECTION 9: Waste Receipt Classification Under 40 CFR 437 (Prtaining to Pre-Treatment Requirements for Centralized Waste Treatment Facilities)

Is this material a wastewater or wastewater sludge? ☐ YES ☒ NO
If 'Yes', complete this section.

PLEASE CHECK THE APPROPRIATE BOX. IF NO APPROPRIATE CATEGORY, GO TO THE NEXT PAGE.

Metals Subcategory: Subpart A

- ☐ Spent electroplating baths and/or sludges
- ☐ Metal finishing rinse water and sludges
- ☐ Chromate wastes
- ☐ Air pollution control blow down water and sludges
- ☐ Spent anodizing solutions
- ☐ Incineration wastewaters
- ☐ Waste liquid mercury
- ☐ Cyanide-containing wastes greater than 136 mg/l
- ☐ Waste acids and bases with or without metals
- ☐ Cleaning, rinsing, and surface preparation solutions from electroplating or phosphating operations
- ☐ Vibratory deburring wastewater
- ☐ Alkaline and acid solutions used to clean metal parts or equipment

Oils Subcategory: Subpart B

- ☐ Used oils
- ☐ Oil-water emulsions or mixtures
- ☐ Lubricants
- ☐ Coolants
- ☐ Contaminated groundwater clean-up from petroleum sources
- ☐ Used petroleum products
- ☐ Oil spill clean-up
- ☐ Bilge water
- ☐ Rinse/wash waters from petroleum sources

- [ ] Interceptor wastes
- [ ] Off-specification fuels
- [ ] Underground storage remediation waste
- [ ] Tank clean-out from petroleum or oily sources
- [ ] Non-contact used glycols
- [ ] Aqueous and oil mixtures from parts cleaning operations
- [ ] Wastewater from oil bearing paint washes

***Organics Subcategory*: Subpart C**

- [ ] Landfill leachate
- [ ] Contaminated groundwater clean-up from non-petroleum sources
- [ ] Solvent-bearing wastes
- [ ] Off-specification organic product
- [ ] Still bottoms
- [ ] Byproduct waste glycol
- [ ] Wastewater from paint washes
- [ ] Wastewater from adhesives and/or epoxies formulation
- [ ] Wastewater from organic chemical product operations
- [ ] Tank clean-out from organic, non-petroleum sources

(1)

If the waste contains oil and grease at or in excess of 100 mg/L, the waste should be classified in the oils subcategory.

(2)

If the waste contains oil and grease less than 100 mg/L, and has any of the pollutants listed below in concentrations in excess of the values listed below, the waste should be classified in the metals subcategory.

Cadmium: 0.2 mg/L
Chromium: 8.9 mg/L
Copper: 4.9 mg/L
Nickel: 37.5 mg/L

(3)

If the waste contains oil and grease less than 100 mg/L, and does not have concentrations of cadmium, chromium, copper, or nickel above any of the values listed above, the waste should be classified in the organics subcategory.

- [ ] Metals Subcategory
- [ ] Oils Subcategory
- [ ] Organics Subcategory

SECTION 10 Additional Instructions

If you cannot determine the correct subcategory in Section 9 and you did not furnish data for the concentration of Cadmium, Chromium, Copper, Nickel, and Oil and Grease, CES will send offsite to a commercial laboratory a sample to determine these concentrations. This will be prior to acceptance. The generator will be responsible for the cost of the analysis.

SECTION 11: Generator's Certification

The information contained herein is based on ☐ generator knowledge and/or ☐ analytical data.
I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no deliberate or willful omissions of compostion properties exist and that all known or suspected hazards have been disclosed. I certify that the materials tested are representative of all materials described by this document.

Authorized Signature: [signature] **Date:** 5/20/08

Printed Name/Title: Timothy J Hylla, VICE President

CES USE ONLY (DO NOT WRITE IN THIS SPACE)

Compliance Officer: ____________
Date: ________ ☐ Approved ☐ Rejected
Approval Number: ____________

SECTION 1:Chemical Product and Company Identification

Manufacturer: EMA, Inc.
Memphis, TN.

Date: November 2007

Product: Isopropyl Alcohol (IPA) ---- 90 to 100% IPA
0 to 10% H20 (water)

Telephone: 888-741-6425
24hr Emergency: 888-741-6425

SECTION 2: Composition/Information on Ingredients

Name: Isopropanol, IPA, 2-Propanol, Dimethyl Carbinol CAS#: 67-63-0

SECTION 3: Hazards Identification

Colorless, volatile liquid with the odor of rubbing alcohol. Isopropyl Alcohol is a dangerous fire risk. Prolonged exposure to elevated concentrations of vapors may result in irritation of the eyes, nose, and throat and central nervous system (CNS) depression. Prolonged dermal exposure can result in dry, cracking skin.

Potential Routes of Exposure: Ingestion, inhalation, dermal contact, eye contact
Target Organs: Eyes, skin, respiratory system
Symptoms of Overexposure:

Inhalation:	Mild irritation of eyes, nose and throat.
Ingestion:	Drowsiness, headache
Dermal Contact:	Dry, cracking skin
Acute Effects:	Irritation of skin and/or upper respiratory tract as noted above. Acute CNS depression may be manifested as giddiness, headache, dizziness and/or nausea.
Chronic Effects:	Chronic exposure can result in skin irritation and contact dermititus Pre-existing disorders of the skin, eyes, and respiratory tract may be exacerbated by exposure to isopropyl alcohol.

HMIS: H=1, F=3, R=0 See Section 8 for PPE information

SECTION 4: First Aid Measures

Eye:	Flush eyes with copious amount of water for at least 15 minutes
Skin:	Flush with water. If irritation persists, seek medical attention.
Ingestion:	Do not induce vomiting if victim is unconscious or drowsy. Seek medical attention or contact the poison control center.
Inhalation:	Remove victim to fresh air and provided oxygen if breathing is difficult. Seek Medical attention if breathing continues to be difficult.

SECTION 5: Fire Fighting Measures

Extinguishing Media: Use water fog, alcohol foam, dry chemical or CO2

Unusual Fire or Explosion Hazards: Containers exposed to intense heat from fires should be cooled with large amounts of water to prevent buildup of internal pressure due to vapor generation which could result in container rupture.

Recommendations: Clear area of unprotected personnel. Wear complete turnout gear. Cool containers exposed to fire with water.

SECTION 6: Accidental Release Measures

Large Spills: Eliminate all ignition sources. Equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Contain source of spill. Dike or otherwise confine spilled product. Uncontrolled releases to air, land, or water may be reportable to the National Response Center (1-800-424-8802).

Small Spills: Take up with absorbent material and place in non-leaking container; seal tightly. Dispose of absorbent (see section 13)

SECTION 7: Handling and Storage

Storage Requirements: Store in tightly closed containers in a cool, dry area away from heat and other possible ignition sources.

Handling precautions: Use non-sparking tools to open containers. Maintain appropriate class of fire extinguishers nearby in case of fire.

SECTION 8: Exposure Controls / Personal Protection

OSHA PEL=400ppm OSHA STEL=500ppm IDLH=12,000ppm

Recommended Engineering Controls: Use explosion-proof ventilation equipment as necessary to maintain airborne concentrations below the PEL. Ground all containers to prevent static sparks during fluid transfers.

Recommended Admin Controls: Train employees on the hazards of Isopropyl Alcohol

PPE: Goggles, gloves, NIOSH approved respiratory protection required when above PEL/TWA

Recommended Hygiene Practices: Clean PPE and work clothing contaminated prior to reuse. After working with this product, be sure to wash before eating, smoking, drinking, or applying cosmetics.

SECTION 9: Physical and Chemical Properties

Appearance: Colorless Liquid UEL: 12% LEL: 2%

Odor: Mild Rubbing Alcohol Odor Threshold: 43ppm Water solubility: Miscible

	50% IPA	70%IPA	91%IPA	99%IPA
Vapor Pressure (@ 68°F) approx.	29mm	23mm	33mm	33mm
Specific Gravity	.929	.878	.790	.790
Boiling Point	176 °F	176 °F	180 °F	181 °F
Flash Point (TAG Open Cup)	74.5 °F	70.5 °F	54 °F	53 °F
Freezing Point	-32--50 °C	-32--50 °C	-32--50 °C	-127 °F
Molecular Weight	47.5	47.5	47.5	60.1
Auto Ignition Temperature	No Data	No Data	No Data	750 °F

SECTION 10: Stability and Reactivity

Stability:	Stable
Polymerization:	Will not occur
Incompatible Chem:	Strong oxidizers, acetaldehyde, chlorine, ethylene oxide, acids, isocyanates
Conditions to avoid:	Heat, sparks, and open flame. Do Not store in aluminum > 120 ^{0} F
Hazardous Products: of Decomposition	CO and unidentified organic compounds may be formed

SECTION 11: Toxicological Information

LD50: 5,840 mg/kg (acute oral - rat); 13,000 mg/kg (acute dermal - rabbit)

LD50: 16,000 ppm/8hr (inhalation - rat) **Mutagenicity:** Not Indicated

LD_{lo} : 5,000 mg/kg (oral - rabbit) **Reproductive Effects:** Not Indicated

Carcinogenicity: Not identified as a carcinogen by OSHO, IARC, or NTP

SECTION 12: Ecological Information

Ecotoxicity: N/A **Environmental Fate:** N/A

Soil Absorption/Mobility: Highly Mobile

Environmental Degradation: Should be removed readily from soils and water by volatilization and biodegradation.

SECTION 13: Disposal Considerations

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Disposal regulatory Requirements: Follow applicable Federal, state, and local regulations. Consider fuels blending as an alternative to incineration.

SECTION 14: Transport Information

DOT Shipping Name: Isopropanol DOT Packing Group: II

DOT Hazard Class: 3 DOT Label: Flammable Liquid

UN ID#: UN 1219

SECTION 15: Regulatory Information

RCRA Hazardous Waste Number/ Classification:D001 CERCLA Substance: N/A

HAZARDOUS AIR POLUTANT (CAA): No SARA 311/312 Codes: N/A

SARA Toxic Chemical: Yes, (Strong manufacturing only)

CERCLA Reportable Quantity: 10,000 lbs (Default)

SECTION 16: Other Information

Prepared by: Cumberland Swan

Sources of Information: 29 CFR1910.1000; NIOSH Pocket Guide to Chemical Hazards (1993); Occupational Health Guidelines for Chemical Hazards; NFPA Guide to Hazardous Materials - 10th Edition.

Disclaimer: While reasonable care has been taken to ensure the accuracy and completeness of the information regarding the material described herein, it is the purchaser's responsibility to ensure the suitability of such information as it applies to the purchaser's intended use of the material.

CES Environmental Services, Inc.

4904 Griggs Road, Houston, TX 77021
Phone: (713) 676-1460 Fax: (713) 676-1676
http://www.cesenvironmental.com
TCEQ Industrial Solid Waste Permit Number: 30948
U.S. EPA ID Number: TXD008950461 ISWR Number: 30900

SECTION 1: Generator Information

Company: VIRBAC US
Address: 13001 St. Charles Rock ROAD
City: Bridgeton State: MO Zip: 63044
Contact: MIKE BURKE Title: ENV. Mgr.
Phone Number: 314 291-6767 Fax Number: 314-291-6432
24/hr Phone Number: 314-291-6767
US EPA ID No: MOD085908259
State ID No: SIC Code: 2819, 2869

SECTION 2: Billing Information - ☐ Same as Above

Company: EMA, INC.
Address: 16627 MIDWEST INDUSTRIAL Blvd.
City: St. LOUIS State: MO Zip: 63132
Contact: Maria Tumbarello Title: Office Mgr.
Phone Number: 314-~~[illegible]~~-785 6425 Fax Number: 314-785-6426

SECTION 3: General Description of the Waste

Name of Waste: WASh WATER Waste
Detailed Description of Process Generating Waste:
spills and Line flushing in Mfg. of animal feed products

Physical State: ☒ Liquid ☐ Solid ☐ Sludge ☐ Filter Cake ☐ Powder ☐ Combination

Color: DARK/DIRTY Odor: solvent

Specific Gravity (water=1): 0.88-1.1 Density: ______ lbs/gal

Does this material contain any total phenolic compounds? ☐ Yes ☒ No

Does this material contain any para substituted phenolic compounds? ☐ Yes ☒ No

Is the Waste subject to the benzene waste operation NESHAP? (40 CFR Part 61, Subpart FF) ☒ Yes ☐ No
Answer "Yes" if your waste contains benzene **AND** if the SIC code from your facility is one of the following:

2812	2813	2816	2819	2821	2822	2823	2824	2833	2834
2835	2836	2841	2842	2843	2844	2851	2861	2865	2869
2873	2874	2876	2879	2891	2892	2893	2896	2899	2911
3312	4953	4959	9511						

Layers: ☒ Single-phase ☒ Multi-phase (2 phase)

Container Type: ☐ Drum ☐ Tote ☒ Truck ☐ Other (explain)

Frequency: ☐ Weekly ☒ Monthly ☐ Yearly ☐ One-Time
Quantity: 5000 gallons

Is this a USEPA "Hazardous Waste" per 40CFR 261.3? ☒ Yes ☐ No

If "Yes", then please complete, sign and date the Underlying Hazardous Constituents Form attached hereto

If "Yes", Is it: ☒ D001 (Ignitable) ☐ D002 (Corrosive) ☐ D003 (Reactive)

Characteristic for Toxic Metals: As- ☒ D004 ☐ D005 ☐ D006 ☐ D007 ☐ D008 ☒ D009 - Hg ☐ D010 ☐ D011

Characteristic for Toxic Organics: D012 thru D043 (please list all that apply)

D022, D035, F002, F003, F005, D040

CHLOROFORM MEK TRICHLORDETHYLENE

Is this an "F" or "K" Listed waste or mixed with one? ☒ Yes ☐ No

If "Yes", then please list ALL applicable codes: F002, F003, F005

Is this a commercial product or spill cleanup that would carry a "U" or "P" waste code under 40 CFR 261.33(e) or (f)? ☐ Yes ☒ No

If "Yes", then please list ALL applicable codes:

Texas State Waste Code Number:

Proper US DOT Shipping Name: Waste Flammable Liquid, N.O.S.

Class: 3 **UN/NA:** UN1993 **PG:** III **RQ:**

Flash Point		pH		Reactive Sulfides		Reactive Cyanides		Solids	
73 to 140		4 to 11		0	mg/l	0	mg/l	<2	%
Oil & Grease		**TOC**		**Zinc**		**Copper**		**Nickel**	
	mg/l		mg/l	0	mg/l	0	mg/l	0	mg/l

SECTION 4: Physical and Chemical Data

COMPONENTS TABLE	CONCENTRATOIN	UNITS
The waste consists of the following materials	Ranges are acceptable	or %
WATER	70-95	
Dimethylethanolamine	5-10	
cyclohexane	<4	
IPA	<4	
Xylene	<4	
Butyl Cellosolve	<4	
AROMATIC Solvent	<4	
mineral seal oil	<4	
Mineral Spirits	<4	
PolyAlklene glycol	0-<1	
dimethoate	0-<1	
methomyl	<4	
ethylene glycol	0-<1	
chloroform	10-18	
Resins		

SECTION 5: Safety Related Data

If the handling of this waste requires the use of special protective equipment, please explain.

No

SECTION 6: Attached Supporting Documents

List all documents, notes, data and/or analysis attached to this form as part of the waste approval package. Attached

SECTION 7: Incompatibilities

Please list ALL incompatibilities (if any):

NONE

SECTION 8: Generator's Knowledge Documentation

Laboratory analysis of the hazardous waste characteristics, listed below, **WAS NOT PERFORMED** based upon the following generator knowledge:

TCLP Metals: ________

TCLP Volatiles: ________

TCLP Semi-Volatiles: ________

Reactivity: ________

Corrosivity: ________

Ignitability: ________

SECTION 9: Waste Receipt Classification Under 40 CFR 437 (Prtaining to Pre-Treatment Requirements for Centralized Waste Treatment Facilities)

Is this material a wastewater or wastewater sludge? ☐ YES ☐ NO

If 'Yes', complete this section.

PLEASE CHECK THE APPROPRIATE BOX. IF NO APPROPRIATE CATEGORY, GO TO THE NEXT PAGE.

Metals Subcategory: Subpart A

- ☐ Spent electroplating baths and/or sludges
- ☐ Metal finishing rinse water and sludges
- ☐ Chromate wastes
- ☐ Air pollution control blow down water and sludges
- ☐ Spent anodizing solutions
- ☐ Incineration wastewaters
- ☐ Waste liquid mercury
- ☐ Cyanide-containing wastes greater than 136 mg/l
- ☐ Waste acids and bases with or without metals
- ☐ Cleaning, rinsing, and surface preparation solutions from electroplating or phosphating operations
- ☐ Vibratory deburring wastewater
- ☐ Alkaline and acid solutions used to clean metal parts or equipment

Oils Subcategory: Subpart B

- ☐ Used oils
- ☐ Oil-water emulsions or mixtures
- ☐ Lubricants
- ☐ Coolants
- ☐ Contaminated groundwater clean-up from petroleum sources
- ☐ Used petroleum products
- ☐ Oil spill clean-up
- ☐ Bilge water
- ☐ Rinse/wash waters from petroleum sources

- [ ] Interceptor wastes
- [ ] Off-specification fuels
- [ ] Underground storage remediation waste
- [ ] Tank clean-out from petroleum or oily sources
- [ ] Non-contact used glycols
- [ ] Aqueous and oil mixtures from parts cleaning operations
- [ ] Wastewater from oil bearing paint washes

***Organics Subcategory*: Subpart C**

- [ ] Landfill leachate
- [ ] Contaminated groundwater clean-up from non-petroleum sources
- [ ] Solvent-bearing wastes
- [ ] Off-specification organic product
- [ ] Still bottoms
- [ ] Byproduct waste glycol
- [ ] Wastewater from paint washes
- [ ] Wastewater from adhesives and/or epoxies formulation
- [ ] Wastewater from organic chemical product operations
- [x] Tank clean-out from organic, non-petroleum sources

(1)

If the waste contains oil and grease at or in excess of 100 mg/L, the waste should be classified in the oils subcategory.

(2)

If the waste contains oil and grease less than 100 mg/L, and has any of the pollutants listed below in concentrations in excess of the values listed below, the waste should be classified in the metals subcategory.

Cadmium: 0.2 mg/L

Chromium: 8.9 mg/L

Copper: 4.9 mg/L

Nickel: 37.5 mg/L

(3)

If the waste contains oil and grease less than 100 mg/L, and does not have concentrations of cadmium, chromium, copper, or nickel above any of the values listed above, the waste should be classified in the organics subcategory.

- [ ] Metals Subcategory
- [ ] Oils Subcategory
- [ ] Organics Subcategory

SECTION 10 Additional Instructions

If you cannot determine the correct subcategory in Section 9 and you did not furnish data for the concentration of Cadmium, Chromium, Copper, Nickel, and Oil and Grease, CES will send offsite to a commercial laboratory a sample to determine these concentrations. This will be prior to acceptance. The generator will be responsible for the cost of the analysis.

SECTION 11: Generator's Certification

The information contained herein is based on [x] generator knowledge and/or [ ] analytical data.
I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no deliberate or willful omissions of compostion properties exist and that all known or suspected hazards have been disclosed. I certify that the materials tested are representative of all materials described by this document.

Authorized Signature: [signature] Date: 5/23/08

Printed Name/Title: Timothy J. Hylla

CES USE ONLY (DO NOT WRITE IN THIS SPACE)		
Compliance Officer:		
Date:	[ ] Approved	[ ] Rejected
Approval Number:		

Arkla Disposal Services LLC
10845 Hwy. 1 South
Shreveport, La. 71115

Facility 318-797-0087
Fax 318-797-6688

Material Profile

Profile Number

A. Generator Information

Company Virbacus **Phone (314)** 291 - 6767 ext. 142

Site Address 13001 St. Charles Rock Road, Bridgeton, MO 63044

Contact / Title Bill Bush, Env. Engineer **Fax (** 314 **)** 291 - 6432

EPA # MOD 085 908 259 **State Generating ID#** ______ **SIC Code** 2819, 2869

B. Billing Information

Company EMA, INC. **Phone (** 314 **)** 785- 6425

Mailing Address 10627 Midwest Industrial Blvd.

St. Louis, MO 63132

Billing Contact Timothy J Hylla **Fax (** 314 **)** 785 - 6426

C. Transporter Information

Company ______ **EPA ID#** ______

US DOT Proper Shipping Name: WASTE FLAMMABLE LIQUID, N.O.S.

DOT Hazard Class 3 **UN/NA #** UN1993 **Packing Group** III

Shipping Frequency: Number of Gallons 5,000 Per: ☒ month ☐ Year ☐ One Time ☐ Other

D. General Waste Information

Non-hazardous ______ **Hazardous** *yes*

Waste Name WASH WATERS AND LINE FLUSH SOLUTIONS

Process Generating Waste spills and wash cleanup from line flushing in manufacturing of animal feed products and other similar products.

Waste Codes: D001, D004, D009, D022, D035, F002, F003, F005

Arkla Disposal Services LLC
10845 Hwy. 1 South
Shreveport, La. 71115

Facility 318-797-0087
Fax 318-797-6688

E. REACTIVE CHARACTERISTICS

☐ Oxidizer ☐ Pyrophoric ☐ Explosive ☐ Radioactive

☐ Carcinogen ☐ Infectious ☐ Shock Sensitive ☐ Water Reactive

F. Physical Properties

Color DARK **Liquid %** 99 **Sludge %** <NONE **Oil %** <5 **Solids %** <1

Specific Gravity 0.88-1.1 **Flash Point** 73 to 140 **pH** 4 to 12.4 **BTUs** 1,000 to 10,500

Single Phase ____ **or Multi Phase** 2 PHASES—ORGANIC AND WATER PHASE

Chemical Composition (List all constituents [including halogenated organics, debris, and UHC's] present in any concentration and submit representative analysis) TOTAL COMPOSITION MUST EQUAL OR EXCEED 100%

Constituents	Concentration Range	Constituents	Concentration Range
Water	40 to 70	Mineral spirits	4 to 5
Dimethylethanolamine	30 to 20	Polyalklene glycol	4 to 5
cyclohexanone	4 to 5	dimethoate	0 to <1
ipa	4 to 5	methomyl	0 to <1
xylene	4 to 5	Ethylene Glycol	0 to 7
Butyl cellosolve	4 to 5	chloroform	0 to <1
Aromatic solvent	6 to 10	Resins	12 to 16
Mineral seal oil	4 to 5		

G. Certification

I certify that all information submitted in this and all attached documents is complete and accurate and that all known or suspected hazards have been disclosed. I further certify that any analytical and/or samples submitted in conjunction wi6th this document are representative of the waste to be shipped.

Authorized Generator Signature ______________________ Date: ____________

Printed Name / Title Timothy J Hylla, VP

H. ARKLA USE ONLY Status: Approved / Rejected

Signature ______________________ Arkla Representative

Signature ______________________ City of Shreveport Representative

ENVIRONMETRICS
www.environmetrics.net

11401 Moog Drive
St. Louis, MO 63146

(314) 432-0550
Fax (314) 432-4977

July 20, 2005

PM RESOURCES, INC.
13001 ST. CHARLES ROCK ROAD
BRIDGETON, MO 63044-2421

Attn: WILLIAM BUSH

Enclosed you will find analytical reports for the samples described below:

Date Received: 07/08/05
Chain of Custody Number: 24651
Project No.: —
P.O.: —
Environmetrics Laboratory Number: 9912/20513

I have reviewed the data generated by the laboratory and have found the data to conform to the applicable methods and QC criteria. Results are reported as received unless otherwise noted on the report. If you have any questions, please feel free to call me at (314) 432-0550.

Sincerely,

Wayne Cooper

Wayne L. Cooper
Project Manager

Enclosure: Invoice Number 67735

This report contains 9 pages.

PM RESOURCES, INC.
13001 ST. CHARLES ROCK ROAD
BRIDGETON, MO 63044-2421

ENVIRONMETRICS

ATTN: WILLIAM BUSH

INVOICE: 67735
PO: ---
PROJECT NO: ---

ANALYSIS RESULTS

SAMPLE ID: ORGANIC WASH WATER
LAB ID: 9912020513-001
DATE COLLECTED: 07/05/05
DATE RECEIVED: 07/08/05

TEST PERFORMED	METHOD OF ANALYSIS	RESULTS		ANALYST
TCLP ARSENIC	SW-846 1311/6010B	<0.030	mg/L	07/18/05 D.B
TCLP BARIUM	SW-846 1311/6010B	0.005	mg/L	
TCLP CADMIUM	SW-846 1311/6010B	<0.004	mg/L	
TCLP CHROMIUM	SW-846 1311/6010B	<0.005	mg/L	
TCLP LEAD	SW-846 1311/6010B	<0.044	mg/L	
TCLP MERCURY	SW-846 1311/7470A	0.0005	mg/L	
TCLP SELENIUM	SW-846 1311/6010B	<0.047	mg/L	
TCLP SILVER	SW-846 1311/6010B	<0.003	mg/L	
PH (ELECTROMETRIC)	SW-846 9040	3.08		07/12/05 D.M

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman
Cc: Keli Lofton, Gary Peterson, Ryan Thomas

Date: 06/09/08

From: Miles Root

Lab Memo: 08-102

Subject: **Enterprise, Baytown Evaluation 0608-13**

A sample of waste water from Enterprise, Baytown has been evaluated for processing at CES. This sample is evaluation #0608-13 and the evaluation form states that it is a composite of all liquids processed at the Baytown plant.

This material fits into the category of a sulfidic caustic. The caustic value, as NaOH, is 8.8 wt%, which is equivalent to 5.1 wt% as sodium. The sulfide sulfur content is 7.0 wt% and the mercaptan sulfur is 0.5 wt%. This material has a sulfidity of 197. The density of this material is 1.245, but we cannot relate this to concentration of caustic due to the unknowns that help to make up this stream. The pH is 11.8.

There is a top organic phase on this stream that will require special attention. This organic layer is approximately five percent of the sample. While it does blend with our light ends without difficulty, the phase separation will be difficult to see visually. We will need to check for water solubility in discerning the phase separations. The sample also contains approximately five percent solids as well that will need to be dealt with. These solids will be more of a sludge in their characteristic that just solids.

This material will blend with the SIB stream and will generate a good amount hydrogen sulfide. The major drawback at this point is that we do not know all of the sources that go into its makeup. From its odor, it contains some other non sulfidic material. It does have a high sulfidity, but the combined sodium and sulfide values are not high enough to make it a strongly desirable stream. There will be extensive labor involved with processing this stream due to the separate phases and solids, but it can be processed.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman
Cc: Keli Lofton, Gary Peterson

Date: 06/09/08

From: Miles Root

Lab Memo: 08-102

Subject: **Enterprise, Baytown Evaluation 0608-13**

A sample of waste water from Enterprise, Baytown has been evaluated for processing at CES. This sample is evaluation #0608-13 and is a composite of all liquids processed at the Baytown plant.

This material fits into the category of a sulfidic caustic. The caustic value, as NaOH, is 8.8 wt%, which is equivalent to 5.1 wt% as sodium. The sulfide sulfur content is 7.0 wt%, mercaptan sulfur is 0.5 wt%. This material has a sulfidity of 197. The density of this material is 1.245, but we cannot relate this to concentration of caustic due to the unknowns that help to make up this stream.

This material will blend with the Targa sulfidic caustic, and we may want to consider marketing the blend. The major drawback at this point is that we do not know all of the sources that go into its makeup. From its odor, it contains some other non sulfidic material. It does have a high sulfidity, but the combined sodium and sulfide values are not high enough to make it a strongly desirable stream. There should be a market available for this material.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson
Cc: Keli Lofton, Gary Peterson

Date: 06/17/08

From: Miles Root

Lab Memo: 08-101

Subject: **Grant Prideco Evaluations 0608-11 and 12 - Updated**

A sample of oil and another sample of oily water from Grant Prideco, Navasota, have been evaluated for potential processing at CES. The sample of oil is used oil from a variety of equipment and is evaluation 0608-11. The oily water comes from both upset machinery and also has been used to cool down pipes. Both of these streams are acceptable for receipt and treatment/recycling at CES.

The oil sample looks to be a good base oil type material. The neat sample has a water of 0.18%; chlor-d-tect of less than 100 ppm; density of 0.876 (API gravity of 30) and a flash point greater than 140 deg F. This is good looking material and its cloudiness clears up nicely when heated to drive off the remaining water. Ash on this oil is 0.17 wt%.

The oily water contains approximately 2.6% oil. The sample will phase separate without much issue if given time. In our plant we would heat it to speed up its processing and remove all of the oil from the water more easily. The water treats easily but produces above average solids. A nice sized flock will form upon treating which will readily phase separate. The treated water has a TOC of 11,110 mg/L, no phenols and acceptable metals. Pricing should include costs for process heating of this material and also above average solids which will need to be disposed.

Volumes of these streams are approximately 3,500 gallons/month of the oil and one 5,000 gallon load of the oily water per week. Both are acceptable for processing at CES.

The table below summarizes the work done on these Grant Prideco evaluation streams.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Grant Prideco		
	Eval 0608-11	Eval 0608-12
pH		8
vol% oil		2.6
TOC, mg/L		11,110
Solids, vol%		0.5
Phenols, ppm		0
Metals		
Cd		0.094
Cr		0.186
Cu		0.148
Ni		0.44
Zn		0.079
Water, vol%	0.18	
Density	0.876	
API Gravity	30	
Ash, wt%	0.17	
Flash Point, deg F	>140	
Chlor-d-tect	<100	

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson
Cc: Keli Lofton, Gary Peterson

Date: 06/05/08

From: Miles Root

Lab Memo: 08-101

Subject: **Grant Prideco Evaluations 0608-11 and 12**

A sample of oil and another sample of oily water from Grant Prideco, Navasota, have been evaluated for potential processing at CES. The sample of oil is used oil from a variety of equipment and is evaluation 0608-11. The oily water comes from both upset machinery and also has been used to cool down pipes. Both of these streams are acceptable for receipt and treatment/recycling at CES.

The oil sample looks to be a good base oil type material. The neat sample has a water of 0.18%, a chlor-d-tect of less than 100 ppm, a density of 0.876 (API gravity of 30) and a flash point greater than 140 deg F. This is good looking material and its cloudiness clears up nicely when heated to drive off the remaining water.

The oily water contains approximately 2.6% oil. The sample will phase separate without much issue if given time. In our plant we would heat it to speed up its processing and remove all of the oil from the water more easily. The water treats easily but produces above average solids. A nice sized flock will form upon treating which will readily phase separate. The treated water has a TOC of 11,110 mg/L, no phenols and acceptable metals. Pricing should include costs for process heating of this material and also above average solids which will need to be disposed.

Volumes of these streams are approximately 3,500 gallons/month of the oil and one 5,000 gallon load of the oily water per week. Both are acceptable for processing at CES.

The table below summarizes the work done on these Grant Prideco evaluation streams.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Grant Prideco		
	Eval 0608-11	Eval 0608-12
pH		8
vol% oil		2.6
TOC, mg/L		11,110
Solids, vol%		0.5
Phenols, ppm		0
Metals		
Cd		0.094
Cr		0.186
Cu		0.148
Ni		0.44
Zn		0.079
Water, vol%	0.18	
Density	0.876	
API Gravity	30	
Flash Point, deg F	>140	
Chlor-d-tect	<100	

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Keli Lofton, Gary Peterson

Date: 06/05/08

From: Miles Root

Lab Memo: 08-100

Subject: **Atlantic Industrial Services Evaluation 0608-10**

A sample of oil, water and antifreeze from Atlantic Industrial Services, 11953 FM 529, evaluation #0608-10, has been evaluated for potential processing at CES. This stream represents material that comes from the recycling of antifreeze and contains residual oil. Eric Duke is the contact at Atlantic @ 281-960-7889.

This material comes in as an emulsion of the oil, water and antifreeze. This material has the potential of 13,000 gallons approximately every month. This material must be heated and acidified in our oil heat tanks. I had to use 6% by volume of our concentrated sulfuric acid after heating in order to break out the oil effectively. The sample needed considerable mixing as well. The oil that does separate out is approximately 50% by volume of the entire sample, so take this into account for pricing.

A chlor-d-tect on the recovered oil is 300 mg/L. The water in the oil was 5.7% in my sample, but this will vary somewhat depending upon how long the oil is allowed to phase separate out after heating and acidification.

The water treats with much difficulty. This sample produces considerably high solids when treated. The entire sample flocks out with solids that will need to be filter pressed. For pricing, allow that the entire recovered water volume will need to be filter pressed. The TOC on the treated and filtered water is a rather high 40,895 mg/L. We will need to set up surcharge pricing for this water. Phenols are very low at 2 ppm and are not an issue. Metals are acceptable.

Overall, this stream will produce approximately have of its volume as good marketable oil. It will take some work to get it to that point. The sample will need to be heated, and the hotter we can get the material the better and quicker the phase separation will be. I used 6% by volume of sulfuric acid of the charge to get the oil to separate out. Using only 3 vol% did not work. Our actual receipts may be slightly different as well. Make sure to account for this acid that will be used in the heat tank in our pricing. The water will need surcharge for high TOC values as well. Metals are not an issue, as stated before.

The table below summarizes the work done on this Atlantic Industrial Services evaluation sample.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
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Fax. (713) 676-1676

Atlantic Industrial Services	
Evaluation 0608-10	
Oil	
chlor-d-tect	300
acid for phasing	6% by volume
Water, vol%	5.7
Water Phase	
phenols, ppm	2
TOC, mg/L	40,895
Metals	
Cd	0.092
Cr	0.242
Cu	0.237
Ni	0.303
Zn	0.300

Miles Root

From: Miles Root
Sent: Thursday, May 29, 2008 2:55 PM
To: Dana Carter
Cc: Marlin Moser; Matt Moser; Gary Peterson; Miles Root
Subject: Targa Evaluation Sample 0508-67

The Targa sample, evaluation 0508-67 has been tested with the following results:
pH = 12.48
density = 1.163 (equivalent to approx. 16% as NaOH)
density of concentrated NH_4OH is 0.985 (use as a reference only)
%NaOH, wt%, by titration = 11.98
%NH_4OH, wt% by titration = 10.48

Data shows that this material most likely does not contain predominately sodium hydroxide, as the density does not match the calculated wt% NaOH. Titration uses HCl, which will react with both caustic and ammonium hydroxide. The calculations above show the results as though the sample were that particular chemical. In other words, they are calculated as though either sodium hydroxide or ammonium hydroxide is the matrix. Also, the low pH of only 12.48 should be around 14 if this sample were predominately caustic. All of this shows that this stream contains both ammonium hydroxide and another salt that causes the density to be higher than what it should if the sample were only ammonium hydroxide. There might be some caustic present, or another neutral salt. Using titration as the analytical tool we cannot differentiate between the two. An ash could be run to get a better guesstimate of the %caustic present, as its ash will be high, whereas the ammonium hydroxide will have no ash.

Miles

EPAHO113001881

Miles Root

From: Miles Root
Sent: Wednesday, June 04, 2008 10:51 AM
To: Matt Bowman; Marlin Moser
Cc: Matt Moser; Joe Camp; Gary Peterson
Subject: Targa Sulfidic Caustic

Evaluation sample 0508-67, a sample of caustic with ammonia, was purged with air. The resulting sulfidic caustic shows the following test results:

Na, wt% = 6.4
Sulfide, as S, wt% = 7.2
Sulfidity = 162

This is good looking, good concentration, and high sulfidity material. Material has no apparent ammonia odor after purging.
Purging experimental work performed by Gary Peterson.

Miles

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson
Cc: Matt Bowman, Kelli Lofton, Gary Peterson

Date: 05/29/08

From: Miles Root

Lab Memo: 08-092

Subject: **Tuboscope NOV Evaluation 0508-65**

A sample of wash water from Tuboscope NOV, Navasota, TX, has been evaluated for processing at CES. This sample is evaluation 0508-65 and is wash water from the cleaning of coating equipment. Overall, this source is acceptable for processing at CES, but will have processing issues that will demand higher than base pricing for this stream.

This sample has no visible floating oil, but is very dark and oily looking. It has a pH of 7.3 and just a trace of solids. The flash point on the neat sample is greater than 140 deg F. Heating and acidification are required to break out an oily sludge that will form on top of the sample. An oily sludge will also fall out of solution and go to the bottom of the tank. It will be necessary to run this sample through the centrifuge system to remove these solids and there will be no real oil to recover.

Treating this acidified water with lime and then polymer will break out clean looking water that will have crud like solids floating on top. I could not get these few solids to fall out of solution. I am assuming that when the tank is emptied after the treat that these solids will end up in the bottom and not stick to the sides. The treated water has an acceptable TOC and metals content.

This source will need both heat and acidification to treat properly. There is no recoverable oil. This information should be used in pricing for this stream. The treated water is totally acceptable for discharge. The table below summarizes the analytical testing on this source.

Tuboscope NOV	
Evaluation 0508-65	
pH	7.3
Phenols, ppm	2
Solids, vol%	trace
TOC, mg/L	4019
Flash point, deg F	> 140
Percent Oil, vol%	0
Metals, ppm	
Cd	0.033
Cr	0.04
Cu	0.064
Ni	0.148
Zn	0.048

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Keli Lofton, Matt Bowman
Cc: Gary Peterson

Date: 06/03/08

From: Miles Root

Lab Memo: 08-099

Subject: **Lubrizol Phenols Evaluation 0508-51-Additional Work**

This is an update to the earlier report issued on 05/27/08, memo 08-090. The seven samples of phenols were again used and a composite sample prepared for testing. The additional tests and corresponding results are found below.

Water, wt%, by Dean Stark Sidearm = 4.3
BTU value = 14,541
Ash, wt% = 0.24

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Keli Lofton, Gary Peterson

Date: 06/03/08

From: Miles Root

Lab Memo: 08-098

Subject: **Kinder Morgan Evaluation 0608-03**

A sample of fuels from Kinder Morgan, Victoria, has been evaluated for potential use in our fuels market. This sample, evaluation 0608-03, comes from a line pigging process and is the first flush after cleaning sludge from a natural gas pipeline.

This sample is a approximately 40% solids with a hydrocarbon layer. The hydrocarbon has a density of 0.84, a chlor-d-tect of 3000 mg/L and a flash point less than 90 deg F. The data sheet indicates this material may contain up to 90% scale, 10-20% diesel/fuel, up to 3% detergent and up to 3% xylenes. The hydrocarbon is easily separated from the solids. A rebuttal will be needed on the chlor-d-tect. No other problems were noted.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Keli Lofton, Kim Harmon
Cc: Gary Peterson

Date: 06/03/08

From: Miles Root

Lab Memo: 08-097

Subject: **KMCO Ethoxylated Polyol Evaluation 0608-01**

A sample of ethoxylated polyol from KMCO has been evaluated for potential marketing into a black oil type of market.

Polyol is the term used to describe compounds with multiple hydroxyl functional groups. Ethylene glycol which we are familiar with is a polyol and has two "OH" or hydroxyl groups. Ethoxylation is the process of adding ethylene oxide to a carboxylic acid. Naphthenic acids that we have processed at the plant are a group of carboxylic acids. Ethoxylated polyols typically are reacted to go into a variety of other products such as cosmetics, thickeners and foams. This is just some background on the type of material we are considering in this evaluation.

This particular sample contains no water as tested by the Dean Stark sidearm method. It has a flash point greater than 140 deg F and has an ash content of 0.16 wt%. The density of this sample is 0.956 g/L. This material does blend with our black oil. I noticed that it also contains some very fine almost crystalline like solids as well.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Keli Lofton, Gary Peterson

Date: 06/02/08

From: Miles Root

Lab Memo: 08-096

Subject: **Weatherford-Elmendorf Evaluation 0508-75**

A sample of water from Weatherford-Elmendorf, San Antonio, has been evaluated for potential processing at CES. This sample, evaluation 0508-75, is the rinse water from a manufacturing process of corrosion inhibitors. Overall, this source looks good for processing with low impurities and no problem issues.

This sample has only a trace of solids along with no phenols or oil. This source also has an acceptable TOC of 5885 mg/L and acceptable metals. The water treats easily and forms typical amounts of solids that readily flock out of solution upon treating. There are no problem issues and pricing may be low enough to cover our basic costs, with a surcharge for TOC values greater than 5000 mg/L.

The table below summarizes the analytical work done on this sample.

Weatherford-Elmendorf	
Evaluation 0508-75	
pH	9
Solids, vol%	Tr
Phenols, ppm	0
TOC, mg/L	5885
Oil, vol%	0
Metals	
Cd	0.043
Cr	0.192
Cu	0.321
Ni	0.878
Zn	0.202

Miles Root

From: Miles Root
Sent: Thursday, May 29, 2008 2:55 PM
To: Dana Carter
Cc: Marlin Moser; Matt Moser; Gary Peterson; Miles Root
Subject: Targa Evaluation Sample 0508-67

The Targa sample, evaluation 0508-67 has been tested with the following results:
pH = 12.48
density = 1.163 (equivalent to approx. 16% as NaOH)
density of concentrated NH_4OH is 0.985 (use as a reference only)
%NaOH, wt%, by titration = 11.98
%NH_4OH, wt% by titration = 10.48

Data shows that this material most likely does not contain predominately sodium hydroxide, as the density does not match the calculated wt% NaOH. Titration uses HCl, which will react with both caustic and ammonium hydroxide. The calculations above show the results as though the sample were that particular chemical. In other words, they are calculated as though either sodium hydroxide or ammonium hydroxide is the matrix. Also, the low pH of only 12.48 should be around 14 if this sample were predominately caustic. All of this shows that this stream contains both ammonium hydroxide and another salt that causes the density to be higher than what it should if the sample were only ammonium hydroxide. There might be some caustic present, or another neutral salt. Using titration as the analytical tool we cannot differentiate between the two. An ash could be run to get a better guesstimate of the %caustic present, as its ash will be high, whereas the ammonium hydroxide will have no ash.

Miles

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Keli Lofton, Gary Peterson

Date: 06/02/08

From: Miles Root

Lab Memo: 08-095

Subject: **Rineco Evaluation 0508-73**

A sample of water from Rineco has been evaluated for potential processing at CES. This sample, evaluation 0508-73, is the water phase from an oil-water separator. Overall, this source looks very good for processing with low impurities and no problem issues.

This sample has no solids, phenols or oil. This source also has low TOC of 1471 mg/L and acceptable metals. The water treats easily and forms typical amounts of solids that readily flock out of solution upon treating. There are no problem issues and pricing may be low enough to cover our basic costs.

The table below summarizes the analytical work done on this sample.

Rineco	
Evaluation 0508-73	
pH	6
Solids, vol%	0
Phenols, ppm	0
TOC, mg/L	1471
Oil, vol%	0
Metals	
Cd	0.156
Cr	0.558
Cu	0.666
Ni	0.516
Zn	1.671

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Keli Lofton, Kim Harmon
Cc: Matt Moser, Marlin Moser, Gary Peterson

Date: 06/02/08

From: Miles Root

Lab Memo: 08-094

Subject: **PPG Trailer 226 Testing and Summary**

A two phased sample from PPG has been tested for sales evaluation. This trailer is 226, document #65062, sampled on 05/30/08.

This sample has a top yellow tinted organic phase of approximately 40% and a 60% aqueous bottom phase that is dark. The density for these two phases is 0.852 for the top and 0.992 for the bottom. As a reference, the density for toluene is 0.867. A 50/50 mix of the bottom phase with water shows it to contain 10% water insoluble organics. A flash point of the bottom phase shows it to be less than 125 deg F. This means that it could be much lower than this, only that is does flash when measured at just less than 125 deg F.

A distillation of the top phase shows a recovery of approximately 85% before decomposition begins to occur, and smoking in the distillation column is noted to become heavy. The top phase does contain a very small amount of water as it can be seen coming over into the distillate and results in a very slightly cloudy appearing distillate.

A data sheet from PPG shows this material to be approximately 95% toluene. This data can only refer to the top phase of this trailer. The distillation of this top phase shows a boiling range very close to the boiling point of toluene. My guess is that an azeotrope is formed during the distillation with the other unknown impurities in the top phase, resulting in close but not exact boiling points for this toluene stream.

We can sell the top phase as a high concentration toluene stream "as is" or distill it for better color. I do not know the market we are looking at. If distillation is a chosen option, we will recover approximately 85% of the sample with the distillate bottoms going into our black oil.

A distillation of the water phase from a 1:1 extraction of the bottom aqueous phase shows no recoverable methanol due to the high starting temperature of the overhead product. A TOC on the aqueous phase of the original sample is a very high 276,900 mg/L.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman
Cc: Kelli Lofton, Gary Peterson

Date: 05/29/08

From: Miles Root

Lab Memo: 08-093

Subject: **Enterprise Sodium Nitrate Evaluation 0508-66**

A sample of sodium nitrate from Enterprise, North Plant (MTBE), has been tested for density to determine its concentration. This sample is evaluation 0508-66. The density of this material is 1.0135, which equates to an approximate 2.5 wt% concentration as sodium nitrate. This concentration based upon chemical reference tables assumes that the sample contains only water and sodium nitrate.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson
Cc: Matt Bowman, Kelli Lofton, Gary Peterson

Date: 05/29/08

From: Miles Root

Lab Memo: 08-091

Subject: **Allied International Broker Evaluation 0508-64**

A sample of waste water from Allied International Broker has been evaluated for processing at CES. This sample is evaluation 0508-64 and is waste water from a tanker washout. Overall, this source looks good for processing at CES.

This sample has no oil, a pH of 8 and just a trace of solids. It is somewhat milky in appearance. The water easily treats, resulting in a nice flock and clear water. The phenols, metals and TOC are all at very acceptable levels. There are no issues with this source and it should be priced accordingly. The table below summarizes the analytical test results for this material.

Allied International Broker	
Evaluation 0508-64	
pH	8
Phenols, ppm	4
Solids, vol%	trace
TOC, mg/L	1943
Flash point, deg F	> 140
Percent Oil, vol%	0
Metals, ppm	
Cd	0.033
Cr	0.031
Cu	0.032
Ni	0.148
Zn	0.039

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman
Cc: Kelli Lofton, Gary Peterson

Date: 05/27/08

From: Miles Root

Lab Memo: 08-090

Subject: **Lubrizol Phenols Evaluation 0508-51**

Seven samples of phenols (cresylic acids) have been evaluated for black oil suitability and blending at CES. These samples are grouped together as evaluation 0508-51. With proper blend ratios, all of the cresylic portion of these samples will blend with black oil.

The MSDS sheet for this material states that it may contain from 0-100% phenol, alkylated phenols or p-tert-butyl phenol, which is a specific alkylated phenol. Its product type is given as "experimental". These compounds are from a class of chemicals known as cresylic acids, which are phenol and substituted phenols. Cresylic acid is a UO52 listed waste. These seven samples represent mixtures from a variety of cresylic acids. All of the samples are solid or sludge and will need to be heated in order for them to be mixed with black oil.

A typical 1:1 mix with black oil was found to be sufficient on four of the samples. Three of the samples needed a higher level of black oil in order to keep the blends from forming a sludge. T-335 has a bottom layer of water that is approximately 20% of the sample. We will not be able to mix the water into the blend. The table below summarizes the minimum recommended ratio of black oil to sample. Extreme care should be taken in handling materials of this nature, due to the potentially hazardous effects.

Lubrizol	
Evaluation 0508-51 – Mix Ratio of Oil to Sample	
T-335	1:1 mix ratio okay; bottom 20% is water
T-484	1:1 mix ratio okay
T-649	2:1 ratio or higher recommended
T-651	2:1 ratio or higher recommended
T-705	1:1 mix ratio okay
LT-1176	1:1 mix ratio okay
N-46873	4:1 ratio or higher recommended

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Kelli Lofton, Gary Peterson

Date: 05/27/08

From: Miles Root

Lab Memo: 08-089

Subject: **<u>RES – Saws Evaluation 0508-55</u>**

A sample of sodium hydroxide from RES-Saws has been evaluated for potential use at CES. This sample is evaluation 0508-55 and is a product that has been stored for a scrubber system that is no longer in use. We can use this material at CES in our SIB processing.

This material analyzes to be 15.1 wt% sodium hydroxide by titration. The density of 1.227 says this material should be closer to 20.7 wt%. This discrepancy is most likely due to the presence of other non titrable salts, such as sodium chlorides or sulfates in the solution. This will not affect its use. There are no sulfides or mercaptans and the solution is water white in appearance with no solids.

We can use a caustic like this for our SIB processing, since we typically make up a 15% solution of sodium hydroxide from 50% caustic for our NaHS tank. It may also be used for the pH adjustment step as well that uses caustic instead of lime. I do not know the potential volume of this source.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Kelli Lofton, Gary Peterson

Date: 05/27/08

From: Miles Root

Lab Memo: 08-088

Subject: **Tru-Green Evaluation 0508-52**

A sample of waste water from Tru-Green has been evaluated for potential processing at CES. This sample is evaluation 0508-52 and is rinse water from fertilizer trucks. This material is stated to potentially have up to two percent nitrogen fertilizer and two percent phosphorous. Overall, this water treats easily and should be acceptable for processing. The only potential issue I see is that the ammonia from the fertilizer may be a high value on actual receipts.

This sample has a pH of 10. The ammonia test strip shows ammonia levels of approximately 70 mg/L. The flash point is greater than 140 deg F and the phenols are 10 ppm. The water treats easily and forms a nice flock that quickly settles out, leaving clear looking water. The metals on the water are acceptable along with the TOC.

I do not know the potential volume of this source, but it needs to be checked for ammonia if we obtain it for processing. Below is a summary of the analytical testing for this water.

Tru-Green	
Evaluation 0508-52	
pH	10
TOC, mg/L	1455
Phenols, ppm	10
Flash Poinit, deg F	> 140
Solids, vol%	0.5
Ammonia, mg/L	70
Treatability	OK
Metals	
Cd	0.05
Cr	0.03
Cu	1.883
Ni	0.477
Zn	0.354

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Kelli Lofton, Gary Peterson

Date: 05/27/08

From: Miles Root

Lab Memo: 08-087

Subject: **Working Solutions Evaluations 0508-53 & 54**

Two samples of oily water from Working Solutions have been evaluated for potential processing at CES. These two samples are evaluations 0508-53 and 54. Overall, both of these samples have good recoverable oil with water that will be easily treated.

Each of these samples is approximately two thirds oil. The oil is light amber in appearance and has a clean separation from the water phase. The chlor-d-tect on both oil samples is low. Flash points are greater than 140 deg F. The water phase on evaluation 0508-54 does treat to form a dark blue black color upon the addition of lime during the treatment phase. When mixed and the polymer is added this color dissipates and the water is slightly amber tinted but clear. This should not be a problem, but thought it worth noting. Evaluation 0508-53 treats without issues. TOC and metals on both treated waters are acceptable.

Both samples look good for processing to recover the oil. The treated waters process easily and there should be minimum issues. Below is a summary of the analytical work on both of these samples.

Working Solutions		
	Eval 0508-53	Eval 0508-54
Water		
pH	7	7
TOC, mg/L	1170	4124
Phenols, ppm	2	4
Treatability	OK	OK
Metals		
Cd	0.068	0.059
Cr	0.097	0.088
Cu	0.091	0.265
Ni	0.349	0.513
Zn	0.227	0.234
Oil		
Flash Point, deg F	> 140	> 140
Chlor-d-tect	100	300

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Houston, TX 77021
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Fax. (713) 676-1676

To: Dana Carter
Cc: Kelli Lofton, Gary Peterson

Date: 05/21/08

From: Miles Root

Lab Memo: 08-086

Subject: **Angel Brothers Evaluation 0508-46**

A sample of oily water from Angel Brothers, 3300 N Main, has been evaluated for potential processing at CES. This sample is evaluation 0508-46. This sample has potential oil for recovery along with solids that will need to be disposed of. The water is acceptable for processing and discharge.

This sample set overnight and was seen to have a bottom layer of sludgy solids, accounting for approximately15% of the sample. The oily water was decanted off and heated. A minimal amount of sulfuric acid is needed to cleanly bring all of the oil to the top. I used approximately 0.5 mL in a 150 mL sample.

The oil has a chlor-d-tect of only 300 mg/L and a flash point of 141 deg F. The recovered oil is approximately 13% of the total volume, discounting the sludgy solids. The solids may settle out in the trailer before being discharged. If not, they will settle out in a tank and will need to be cleaned out.

The water has a pH of 7 and has no phenols. The water treats easily and has a nice flock with typical solids and no issues. TOC on the treated water is only 1514 mg/L. Metals on the treated water are also low. The table below summarizes the analytical testing.

Angel Brothers	
Evaluation 0508-46	
Water	
pH	7
Phenols, ppm	0
TOC, ppm	1514
Metals	
Cd	0.098
Cr	0.077
Cu	0.113
Ni	0.260
Zn	0.071
Oil	
Flash Point, deg F	141
Chlor-d-tect, ppm	300
Density, g/L	0.86

Miles Root

From: Godefroy Gbery
Sent: Monday, May 19, 2008 2:41 PM
To: Miles Root; Bo Cumberland
Cc: Gary Peterson
Subject: FW: Sample evaluation for TPC

05 08 - 37

From: Godefroy Gbery
Sent: Sunday, May 18, 2008 5:02 PM
To: Gary Brauckman; Marlin Moser
Subject: RE: Sample evaluation for TPC

The sample has about 40 % solid and the density of the liquid phase is 0.81 and flash at room temperature. This product can be recycled and used as light ends.
Let me know if you need additional information.
Thanks,
Godefroy

From: Gary Brauckman
Sent: Friday, May 16, 2008 4:40 PM
To: Godefroy Gbery; Marlin Moser
Subject: Sample evaluation for TPC

Hello Godefroy:

I submitted a fuel oil sample from TPC yesterday for the lab to evaluate. Please see if you can run this sample on Sunday and send me a report as to your findings. If you have questions, feel free to call me. I would like to have an answer for my customer on Monday.

Thanks

Gary Brauckman

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Services, Inc.

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To: Matt Bowman
Cc: Kelli Lofton, Gary Peterson

Date: 05/19/08

From: Miles Root

Lab Memo: 08-085

Subject: **DANA Containers Evaluation 0508-35**

A sample of sludge from DANA Containers has been evaluated for potential processing at CES. This sample is evaluation 0508-35. This sample is UF concentrate tank sludge. The best opportunity for this material is to receive it as a non hazardous waste and move it into a landfill.

This sample was vacuum filtered with a resulting water content of approximately 10%. Metals were run on the filtered but non treated water to determine their concentration level and were found to be low. Attempts to filter this material at our facility and process it through our filter press would generate more solids that what we would have from the neat sample, due to the addition of the DE. With a recoverable water of only around 10%, this just would not be worth the extra effort. This material should be processed by moving to a non hazardous landfill. Pricing should cover all costs of picking this material up in a vacuum truck and moving to a landfill for disposal. This is a fairly thick sludge but nothing that we cannot pick up with our vacuum truck.

A summary of the metals on the filtered but non treated water are below.

0805-35	
Metals	
Cd	0.015
Cr	0.000
Cu	0.055
Ni	0.233
Zn	0.200

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Services, Inc.

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To: Dana Carter
Cc: Kelli Lofton, Gary Peterson

Date: 05/19/08

From: Miles Root

Lab Memo: 08-084

Subject: **GATX Hearne Evaluation 0508-31**

A sample of acrylic acid from GATX, Hearne, has been evaluated as a potential acquisition for marketing. This sample is evaluation 0508-31.

This sample is an off spec acrylic acid product of approximately 6000 gallons. Acrylic acid has an acrid odor somewhat like acetic acid. It is a clear, colorless liquid. A BTU on this sample shows 7414 BTU/lb. The density is 1.054. The ash on this material is 0.0%. This sample mixes with light ends but transmits its odor to the blend. If odor is an issue, then this will be an issue. No other issues were noted.

Miles Root

From: Dana Carter
Sent: Wednesday, May 14, 2008 4:27 PM
To: Miles Root
Subject: FW: Acrylic Acid

Profile to go with sample 0508-31

Dana Carter
Account Manager
CES Environmental Services Inc
Office: 713-676-1460
Cell: 713-748-9804
Fax: 713-676-1676

From: Ricardo.Salias@gatx.com [mailto:Ricardo.Salias@gatx.com]
Sent: Friday, May 09, 2008 9:55 AM
To: Dana Carter
Subject: Acrilic a Acid

Could you provide disposal cost. Have a car with 6000gls.

Bulk and drums.

----- Forwarded by Ricardo Salias/CHI/GATXCORP on 05/09/2008 10:52 AM -----

Cover Sheet:	Link
French MSDS:	
MSDS NUMBER:	
CUSTOMER NUMBER:	
STOCK NUMBER:	
CIN NUMBER:	0614-08
STCC NUMBER:	2818692

Material Safety Data Sheet

BASF CORPORATION
BASF

MATERIAL SAFETY DATA SHEET

ORIGINAL DATE: 07/17/1992
REVISION DATE: 02/02/2000

BASF CORPORATION
3000 CONTINENTAL DRIVE NORTH
MOUNT OLIVE, NJ 07828
(973) 426-4671

EMERGENCY TELEPHONE:
(800) 424-9300 (CHEMTREC)
(800) 832-HELP (BASF HOTLINE)

BOTH NUMBERS ARE AVAILABLE DAYS, NIGHTS, WEEKENDS, & HOLIDAYS.

------SECTION 1 - PRODUCT INFORMATION ------

ACRYLIC ACID, ESTER GRADE

PRODUCT ID: NCO 526108

COMMON CHEMICAL NAME:
ACRYLIC ACID, ESTERIFICATION GRADE, FROM PROPYLENE OXIDATION

SYNONYMS: 2-PROPENOIC ACID; VINYL FORMIC ACID

MOLECULAR FORMULA: C3 H4 O2

CHEMICAL FAMILY: ALIPHATIC ACID

MOLECULAR WT.: 72.0

------SECTION 2 - INGREDIENTS ------

CHEMICAL NAME:	CAS	AMOUNT	ACGIH TLV	SKIN
ACRYLIC ACID, ESTERIFIED	79-10-7	98.0%		TWA 2 PPM
PHENOTHIAZINE(INHIBITOR)	92-84-2	450.0-550.0 PPM		TWA 5 MG/CU. M

------SECTION 3 - PHYSICAL PROPERTIES ------

COLOR: COLORLESS

FORM/APPEARANCE: CLEAR LIQUID

ODOR: ACRID

ODOR INTENSITY: SHARP

	TYPICAL	LOW/HIGH	U.O.M.
SPECIFIC GRAVITY:	1.05		

PH: NOT AVAILABLE

	TYPICAL	LOW/HIGH	DEG.	@	PRESSURE
BOILING PT:	141		C	760	MM Hg
FREEZING PT:	13		C	1	ATMOSPHERES

DECOMP. TMP: NOT AVAILABLE

SOLUBILITY IN WATER DESCRIPTION: COMPLETE

VAPOR PRESSURE: 4 MM Hg 20 DEG. C

VAPOR DENSITY (AIR = 1): 2.5

EVAPORATION RATE STD.: TYPICAL LOW/HIGH U.O.M. @ TEMPERATURE

------SECTION 4 - FIRE AND EXPLOSION DATA ------

	TYPICAL	LOW/HIGH	DEG.	METHOD
FLASH POINT:	54		C	TAG CLOSED CUP
AUTOIGNITION:	412		C	NONE SPECIFIED
FLAM. LIMITS:		2 - 8	%	

EXTINGUISHING MEDIA:
USE WATER FOG, FOAM, DRY CHEMICAL, HALON OR CO2 AS EXTINGUISHING MEDIA.

FIRE FIGHTING PROCEDURES:
FIREFIGHTERS SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND TURN OUT GEAR. WATER MAY BE INEFFECTIVE BUT SHOULD BE USED TO KEEP EXPOSED CONTAINERS COOL.

UNUSUAL HAZARDS:
DUE TO THE POLYMERIZATION POTENTIAL WHEN EXPOSED TO HEAT, SEALED CONTAINERS MAY RUPTURE EXPLOSIVELY. IN ADVANCED OR MASSIVE FIRES, FIGHT FIRE FROM A DISTANCE OR FROM PROTECTED AREA.

------SECTION 5 - HEALTH EFFECTS ------

ROUTES OF ENTRY FOR SOLIDS AND LIQUIDS INCLUDE EYE AND SKIN CONTACT, INGESTION AND INHALATION. ROUTES OF ENTRY FOR GASES INCLUDE INHALATION AND EYE CONTACT. SKIN CONTACT MAY BE A ROUTE OF ENTRY FOR LIQUIFIED GASES.

TOXICOLOGY TEST DATA:

RAT, 12 MONTH DRINKING WATER STUDY - 2000 - 5000 PPM
REDUCED BODY WEIGHT, FOOD & WATER INTAKE.

CODE NOT USED - NOAEL: 1200 PPM
NO COMPOUND RELATED ONCOGENIC EFFECTS

RAT, 90 DAY ORAL GAVAGE STUDY - 150 & 300 MG/KG/DAY
CODE NOT USED.

RAT, 90 DAY DRINKING WATER STUDY - .083,.25,.75 MG/KG/DAY
CODE NOT USED

RAT, INHALATION DEVELOPMENTAL TOXICITY - @ 40,120,360 PPM
NEITHER EMBRYOTOXIC NOR TERATOGENIC.

RAT, 2 WEEK (9 DOSE) INHALATION STUDY - NOEL = 75 PPM
CODE NOT USED

RAT, 13 WEEK INHALATION STUDY - NOEL = 25 PPM
RESPIRATORY TRACT IRRITANT.

CODE NOT USED -
RESPIRATORY TRACT IRRITANT.

CODE NOT USED -
CODE NOT USED.

CODE NOT USED -
STATISTICAL, NOT BIOLOGICAL SIGNIFICANCE.

RAT, INHALATION HAZARD TEST, 1 HOUR -
NO EFFECTS.

CODE NOT USED -
CODE NOT USED.

CHO CHROMOSOMAL ABERRATION STUDY - POSITIVE
CODE NOT USED.

CHO SISTER CHROMATID EXCHANGE (WITH S-9) - POSITIVE
CODE NOT USED.

RAT CHROMOSOME ABERRATION: BONE MARROW - NEGATIVE
NOT CLASTOGENIC.

MOUSE LYMPHOMA FORWARD MUTATION ASSAY - POSITIVE
POSITIVE RESPONSE WITHOUT ACTIVATION.

MOUSE LYMPHOMA ASSAY (WITH S-9) - POSITIVE
POSITIVE RESPONSE WITH ACTIVATION.

AMES SALMONELLA ASSAY (DIRECT PLATE) - NEGATIVE
NO INCREASE IN MUTATION FREQUENCY.

CODE NOT USED -
CODE NOT USED.

CODE NOT USED -
CODE NOT FOUND.

UNSCHEDULED DNA SYNTHESIS - NEGATIVE
NEGATIVE.

CHO/HGPRT FORWARD MUTATION ASSAY - NEGATIVE
NEGATIVE.

CHO/HGPRT FORWARD MUTATION (WITH S-9) - NEGATIVE
NEGATIVE.

RAT CHROMOSOME ABERRATION: BONE MARROW - NEGATIVE
NEGATIVE.

CHO CHROMOSOMAL ABERRATION STUDY - POSITIVE
POSITIVE RESPONSE WITHOUT ACTIVATION.

CHO CHROMOSOMAL ABERRATION (WITH S-9) - POSITIVE
POSITIVE RESPONSE WITH ACTIVATION.

DROSOPHILA SEX LINKED RECESSIVE LETHAL - NEGATIVE
NOT MUTAGENIC.

CODE NOT USED - IV, ORAL, DE
CODE NOT USED.

CODE NOT USED - 500, 2500, 5 PPM
NO EFFECT ON REPRODUCTION.

RABBIT DEVELOPMENTAL TOXICITY/INHALATION - @ 25, 75, 22 PPM

CODE NOT USED.

MOUSE, DERMAL ONCOGENICITY STUDY - 1%; 25, 100 UL
CODE NOT USED.

CODE NOT USED - LYMPHOSARCOM
CODE NOT USED.

RAT, ORAL LD50 - 1500 MG/KG
MODERATELY TOXIC.

RABBIT, DERMAL LD50 - 640 MG/KG
MODERATELY TOXIC.

RAT, 4 HR INHALATION LC50 - > 5.1 MG/L
MODERATELY TOXIC.

RABBIT, PRIMARY SKIN IRRITATION -
CORROSIVE.

RABBIT, MUCOUS MEMBRANE IRRITATION STUDY -
CORROSIVE.

RAT INHALATION RISK TEST; SAT. VAPOR/20C -
NO DEATHS @ 30MIN, LETHAL @ EXTENDED EXP.

ACUTE OVEREXPOSURE EFFECTS:
ACRYLIC ACID IS CORROSIVE TO ALL TISSUES. EYE CONTACT CAN CAUSE SEVERE BURNS AND LOSS OF VISION. A 1% AQUEOUS SOLUTION OF ACRYLIC ACID CAN CAUSE SIGNIFICANT IRRITATION AND EYE DAMAGE. CONTACT WITH THE SKIN CAN CAUSE SEVERE BURNS WHICH MAY BE DELAYED.

ACRYLIC ACID IS A CORROSIVE LIQUID WHICH CAN CAUSE BURNS AND PERMANENT EYE DAMAGE; INHALATION OF ACRYLIC ACID RESULTED IN NASAL LESIONS IN BOTH RATS AND MICE. PURE ACRYLIC ACID DOES NOT APPEAR TO CAUSE SKIN SENSITIZATION.

CHRONIC OVEREXPOSURE EFFECTS:
ACRYLIC ACID WAS NOT CARCINOGENIC WHEN ADMINISTERED TO RATS VIA DRINKING WATER (78 MG/KG/DAY) OVER A LIFETIME. IN ADDITION, LIFETIME INHALATION EXPOSURES (5-135 PPM) OF RATS TO METHYL ACRYLATE, ETHYL ACRYLATE AND BUTYL ACRYLATE DID NOT CAUSE CARCINOGENIC EFFECTS; ALTHOUGH NASAL LESIONS WERE NOTED AT THE HIGHER CONCENTRATIONS (JUST AS WITH ACRYLIC ACID). IN 1998, THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC) DETERMINED THAT ACRYLIC ACID WAS NOT CLASSIFIABLE AS TO ITS CARCINOGENICITY TO HUMANS (GROUP 3).

FIRST AID PROCEDURES - SKIN:
WASH AFFECTED AREAS WITH SOAP AND WATER. REMOVE AND LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. GET IMMEDIATE MEDICAL ATTENTION.

FIRST AID PROCEDURES - EYES:
IMMEDIATELY RINSE EYES WITH RUNNING WATER FOR 15 MINUTES. GET IMMEDIATE MEDICAL ATTENTION.

FIRST AID PROCEDURES - INGESTION:
IF SWALLOWED , DO NOT INDUCE VOMITING. DILUTE WITH WATER OR MILK AND GET IMMEDIATE MEDICAL ATTENTION. NEVER GIVE FLUIDS OR INDUCE VOMITING IF THE VICTIM IS UNCONSCIOUS OR HAVING CONVULSIONS.

FIRST AID PROCEDURES - INHALATION:
MOVE TO FRESH AIR. AID IN BREATHING, IF NECESSARY, AND GET

IMMEDIATE MEDICAL ATTENTION.

FIRST AID PROCEDURES - NOTES TO PHYSICIANS: NONE KNOWN.

FIRST AID PROCEDURES - AGGRAVATED MEDICAL CONDITIONS:
NO DATA IS AVAILABLE WHICH ADDRESSES MEDICAL CONDITIONS THAT ARE GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE TO THIS PRODUCT. PLEASE REFER TO THE EFFECTS OF OVEREXPOSURE SECTION FOR EFFECTS OBSERVED IN ANIMALS.

FIRST AID PROCEDURES - SPECIAL PRECAUTIONS: NONE

------SECTION 6 - REACTIVITY DATA ------

STABILITY DATA: STABLE

INCOMPATIBILITY:
STRONG OXIDIZERS, ALKALIES, ALDEHYDES, ETHERS AND AMINES.

CONDITIONS/HAZARDS TO AVOID:
DO NOT STORE IN EXCESS OF 6 MONTHS WITH LESS THAN 10% HEADSPACE ABOVE LIQUID.

HAZARDOUS DECOMPOSITION/POLYMERIZATION:
HAZARDOUS POLYMERIZATION MAY OCCUR. AVOID EXCESSIVE HEAT, INHIBITOR LOSS, AND CONTAMINANTS, INCLUDING MOISTURE. HAZARDOUS DECOMPOSITION PRODUCTS ARE CO AND CO2.

CORROSIVE PROPERTIES: NOT CORROSIVE TO METAL.

OXIDIZER PROPERTIES: NOT AN OXIDIZER

OTHER REACTIVITY DATA: NONE KNOWN.

------SECTION 7 - PERSONAL PROTECTION ------

CLOTHING:
GLOVES, COVERALLS, APRON, AND BOOTS AS NECESSARY TO PREVENT CONTACT.

EYES:
CHEMICAL GOGGLES; ALSO WEAR A FACE SHIELD IF SPLASHING HAZARD EXISTS.

RESPIRATION:
IF VAPORS OR MISTS ARE GENERATED, WEAR A NIOSH/MSHA APPROVED ORGANIC VAPOR/MIST RESPIRATOR. USE AN AIR-SUPPLIED OR SELF-CONTAINED BREATHING APPARATUS IN EMERGENCY OR NON-ROUTINE, HIGH EXPOSURE SITUATIONS.

VENTILATION: USE LOCAL EXHAUST TO CONTROL TO RECOMMENDED P.E.L.

EXPLOSION PROOFING: NONE REQUIRED.

OTHER PERSONAL PROTECTION DATA:
EYEWASH FOUNTAINS AND SAFETY SHOWERS MUST BE EASILY ACCESSIBLE.

------SECTION 8 - SPILL-LEAK/ENVIRONMENTAL ------

GENERAL:
SPILLS SHOULD BE CONTAINED, SOLIDIFIED AND PLACED IN SUITABLE CONTAINERS FOR DISPOSAL IN A RCRA LICENSED FACILITY. THIS MATERIAL IS RCRA HAZARDOUS DUE TO ITS PROPERTIES.

WASTE DISPOSAL:
INCINERATE AT A RCRA LICENSED FACILITY. DO NOT DISCHARGE INTO WATERWAYS OR SEWER SYSTEMS WITHOUT PROPER AUTHORITY.

CONTAINER DISPOSAL:
EMPTY CONTAINERS WITH LESS THAN 1 INCH OF RESIDUE MAY BE LANDFILLED AT A LICENSED FACILITY. RECOMMEND CRUSHING OR OTHER MEANS TO PREVENT UNAUTHORIZED REUSE. OTHER CONTAINERS MUST BE DISPOSED OF IN A RCRA LICENSED FACILITY.

ENVIRONMENTAL TOXICITY TEST DATA:
RAINBOW TROUT, FLOW-THROUGH 96 HR LC50 - 27 MG/L
SLIGHTLY TOXIC

TROUT, 96 HR NO EFFECT CONCENTRATION - 6.3 MG/L
TEST RATING NOT FOUND

OECD, CLOSED BOTTLE TEST (301 D) - 81 PERCENT
READILY BIODEGRADABLE

ELIMINATION (OECD TEST 302 B) - > 70 PERCENT
EASY TO ELIMINATE

RAINBOW TROUT, STATIC 96 HR LC50 - 27 MG/L
SLIGHTLY TOXIC

DAPHNIA MAGNA, 48 HR STATIC EC50 - 95 MG/L
SLIGHTLY TOXIC

ACUTE ALGAL TOXICITY, 72 HR. EC/LC50 - 0.04 MG/L
HIGHLY TOXIC

BACTERIAL TOXICITY, LC50 (16 HR) - 41 MG/L
TEST RATING NOT FOUND

CODE NOT USED - > 8.1 MG/L
MODERATELY TOXIC

INHIBITION OF ACTIVATED SLUDGE - 900 MG/L
TEST RATING NOT FOUND

------SECTION 9 - STORAGE AND HANDLING ------

GENERAL:
AVOID EXCESSIVE HEAT, DIRECT SUNLIGHT, INHIBITOR LOSS, AND CONTAMINANTS. MAINTAIN CONTACT WITH ATMOSPHERE OF 5-21% OXYGEN. DO NOT USE INERT ATMOSPHERE AS BLANKET. STORE AT TEMPERATURES OF 15-25 C. AVOID OVERHEATING OR FREEZING. NEVER USE STEAM OR ELECTRICAL HEATING TO THAW FROZEN ACRYLIC ACID OR ITS CONTAINERS. IF FROZEN, USE WARM WATER (45 C MAX) OR HEATED ROOM (BETWEEN 20-33 C) TO THAW MATERIAL. KEEP ACID FREE OF CONTAMINATION AND MOISTURE. UNDER THESE CONDITIONS, A STORAGE STABILITY OF 1 YEAR IS EXPECTED.

------SECTION 10 - REGULATORY INFORMATION ------

TSCA INVENTORY STATUS:
LISTED ON INVENTORY: YES

SARA - 313 LISTED CHEMICALS:
CAS: 79-10-7

AMOUNT: 98.0%
NAME: ACRYLIC ACID, ESTERIFIED

RCRA HAZ. WASTE NO.: U008
CERCLA: YES
REPORTABLE QTY.: (IF YES) 5000 LBS

STATE REGULATORY INFORMATION: (BY COMPONENT)
NJ/PA/MA RTK: YES
CAS : 79-10-7
NAME: ACRYLIC ACID, ESTERIFIED

HAZARD RATINGS:
HMIS
HEALTH: 3
FIRE: 2
REACTIVITY: 2
SPECIAL: NA

NFPA
HEALTH: 3
FIRE: 2
REACTIVITY: 2
SPECIAL: NA

THIS PRODUCT IS HAZARDOUS OR CONTAINS COMPONENTS WHICH ARE HAZARDOUS ACCORDING TO THE OSHA HAZARD COMMUNICATION STANDARD.

INTERNATIONAL REPORTING:
EINECS (EUROPE) - YES
MITI (JAPAN) - YES
AUSTRALIA - YES

MASSACHUSETTS RIGHT-TO-KNOW LISTED: - YES
HAZARD CODE: N/A

PENNSYLVANIA RIGHT-TO-KNOW LISTED: - YES
HAZARD CODE: ENVIRONMENTAL HAZARD

------SECTION 11 - TRANSPORTATION INFORMATION ------

DOT PROPER SHIPPING NAME: SEE BELOW

DOT TECHNICAL NAME: SEE BELOW

DOT PRIMARY HAZARD CLASS: SEE BELOW

DOT SECONDARY HAZARD CLASS: SEE BELOW

DOT LABEL REQUIRED: SEE BELOW

DOT PLACARD REQUIRED: SEE BELOW

DOT POISON CONSTITUENT: SEE BELOW

BASF COMMODITY CODES:
UN/NA CODE: NA
E/R GUIDE: NA

BILL OF LADING DESCRIPTION:
ACRYLIC ACID, INHIBITED, 8, (3), UN2218, PGII

"IMPORTANT:
WHILE THE DESCRIPTIONS, DESIGNS, DATA AND INFORMATION CONTAINED HEREIN ARE PRESENTED IN GOOD FAITH AND BELIEVED TO BE ACCURATE, IT IS PROVIDED FOR YOUR GUIDANCE ONLY. BECAUSE MANY FACTORS MAY AFFECT PROCESSING OR APPLICATION/USE, WE RECOMMEND THAT YOU MAKE TESTS TO DETERMINE THE SUITABILITY OF A PRODUCT FOR YOUR PARTICULAR PURPOSE PRIOR TO USE. NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING PRODUCTS DESCRIBED OR DESIGNS, DATA OR INFORMATION SET FORTH, OR THAT THE PRODUCTS, DESIGNS, DATA OR INFORMATION MAY BE USED WITHOUT INFRINGING THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS. IN NO CASE SHALL THE DESCRIPTIONS, INFORMATION, DATA OR DESIGNS PROVIDED BE CONSIDERED A PART OF OUR TERMS AND CONDITIONS OF SALE. FURTHER, YOU EXPRESSLY UNDERSTAND AND AGREE THAT THE DESCRIPTIONS, DESIGNS, DATA, AND INFORMATION FURNISHED BY BASF HEREUNDER ARE GIVEN GRATIS AND BASF ASSUMES NO OBLIGATION OR LIABILITY FOR THE DESCRIPTION, DESIGNS, DATA AND INFORMATION GIVEN OR RESULTS OBTAINED, ALL SUCH BEING GIVEN AND ACCEPTED AT YOUR RISK".

3000 CONTINENTAL DRIVE - NORTH
MOUNT OLIVE, NEW JERSEY 07828-1234
(973) 426-2600

BACEO

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson
Cc: Kelli Lofton, Gary Peterson

Date: 05/15/08

From: Miles Root

Lab Memo: 08-083

Subject: **NOV Rolligon Evaluations 0508-29**

A sample of oil from NOV Rolligon, Anderson, TX has been evaluated as a potential acquisition for marketing. This sample is evaluation 0508-29. This looks like a good potential oil acquisition that we will be able to market.

This sample is 90% oil with an aqueous layer of 10%. The oil's ash content is 0.22 wt% with water content in the oil of 1.8%. Density of this oil is 0.859. While this oil blends with our black oil, it has a reddish brown hue. If this comes from some type of automotive/industrial fluid recycling facility possibly transmission fluid is getting mixed into this to give its rather unique coloring. Since this will probably be coming in tote quantities this coloring will be lost when mixed with our regular black oil.

This looks like a material we should pursue obtaining.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Kelli Lofton, Gary Peterson

Date: 05/14/08

From: Miles Root

Lab Memo: 08-082

Subject: **MTI Sample Evaluations 0508-12 thru 14**

Three samples of unknown materials have been evaluated for potential receipt and processing at CES. These samples are evaluations 0508-12 thru 0508-14. All of these materials are listed as unknowns. As such, if the supplier cannot provide an MSDS sheet or verify that these materials are non hazardous, they must be classified as listed hazardous wastes and go to incineration for disposal.

Evaluation 0508-12 is an unknown single drum of material that looks like a viscosity modifier. It blends easily with black oil. Without any other information, this looks to be the best fit for this material. It is very thick so it will not readily leave the drum, and sitting in the sun a day or so will help this out.

Evaluation 0508-13 is two drums of material that may be biodiesel feedstock with mineral oil. This material does have the odor of cooking oil. Again, it blends well with black oil in small quantities and this would be a good placement for it as well.

Evaluation 0508-14 is a single drum of a corrosive liquid. It has a pH of 0. Density of this material is 1.817. It can be neutralized with 2.5 times the volume with 50% NaOH. While this is a very violent and potentially dangerous reaction, it can be done, as it was performed in the lab. I have sent a portion of this sample out for testing by ion chromatography in the hopes of identifying it as a mineral acid. I have yet to receive any test results.

In the absence of any further information from the supplier, all of these drums of material will need to be accepted as listed hazardous wastes and go to incineration for disposal. If information is provided that they are non hazardous, then the uses as described above will be adequate.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Kelli Lofton, Gary Peterson

Date: 05/14/08

From: Miles Root

Lab Memo: 08-081

Subject: **Burbank Barrel & Drum Evaluation 0508-21**

A sample of emulsified oil from Burbank Barrel & Drum has been evaluated for potential receipt and processing at CES. This sample is evaluation 0508-21. This emulsion can be processed with some slight difficulty to recover the oil. The resulting treated water will require dilution due to high zinc. There is approximately 10K gallons of this material available.

The sample contains three distinct phases. There is a top oil phase of about 15%, a middle emulsion phase of 40% and a bottom phase of 45%. The aqueous phase also contains caustic. Any mixing emulsifies the entire mixture with many hours required for any natural phasing to occur.

The entire sample must be heated and acidified for the oil to phase out. This process in the lab was violent as the sulfuric acid was added, due to the caustic. Patience will be needed. The resulting top phase is approximately 60% but also contains water. For pricing on net oil for this material the lab will need to perform a quantitative treat, quantitate the top oil layer, and then determine the water content on this oil layer. Deducting the water will give us the net oil value to pay on. The oil has a chlor-d-tect value of 2000, so the vendor must supply a rebuttal. The treated water is high in nickel and zinc, with the zinc showing 8.6 ppm, so it will need to be diluted with good water before discharge.

Below is a summary of the analytical work performed on this sample.

Burbank Barrel & Drum	
Evaluation 0508-21	
chlor-d-tect, mg/L	2000
Recoverable wet oil, %	60
Metals on treated water	
Cd	0.103
Cr	0.008
Cu	0.08
Ni	2.323
Zn	8.6

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Kelli Lofton, Gary Peterson

Date: 05/14/08

From: Miles Root

Lab Memo: 08-080

Subject: **GATX Hearne Sample Evaluation 0508-20**

A sample of spent caustic soda from GATX, Hearne, has been evaluated for potential receipt for processing at CES. This sample is evaluation 0508-20. This very weak spent caustic solution can be processed without too many issues.

This source is spent caustic removed as a heel from a rail car before cleaning. It appears to be the remnants of cleaning a car with caustic. There are five drums of this material. The sample treats easily, has a low TOC, metals and phenols. The solids are high at 9% but they can be filtered. There are no sulfides or mercaptans present and the pH is 11.2. The processing of drums will require extra time and energy on the part of the plant.

A summary of the analytical testing is found below.

GATX Hearne Evaluation 0508-20	
pH	11.2
solids, vol%	9
Phenols, ppm	1
NaOH, wt%	1
Density	1.017
Sulfides, as S, wt%	0
Mercaptans, as S, wt%	0
TOC, ppm	1380
Metals	
Cd	0.104
Cr	0.013
Cu	0.05
Ni	0.308
Zn	0.116

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To: Joy Baker
Cc: Kelli Lofton, Gary Peterson

Date: 05/14/08

From: Miles Root

Lab Memo: 08-079

Subject: **EMA Evaluations 0508-07thru 09**

Three samples from EMA have been evaluated as potential acquisitions for recycle/resale by CES. These samples are evaluations #0508-07 thru 0508-09. We can accept all three sources, as is detailed below.

Sample evaluation 0508-07 is caustic. It is very clean looking, free of any odors and contains no solids or oils. This sample titrates to be 5.3 wt% as NaOH and has a density of 1.042, which is reasonable for this concentration. This source has a potential of one load per month. We do not want to treat caustic of this quality as water at our plant. It can be used by paper mills and moved to KMTEX at this low volume without problems. I don't believe there is any type of market for a 5% caustic stream "as is", as it is much too weak.

Sample evaluation 0508-08 is a supposed mixture of MEK and xylenes. This sample is a cloudy colorless sample that is single phased. A distillation of this material shows a 70% recovery before decomposition. There is one clear temperature change between 10 and 15% recovery that points to a distinct change in the overhead composition. The pot bottoms is an orange viscous material, which looks like a resin. We will gain nothing by distilling this material and trying to market it. This sample will make a good solvent and should be marketed as such. Its cloudy appearance will most likely cause its value to be decreased. This source has a potential of one load per quarter. We need to market it without further processing.

Evaluation 0508-08 is a two phased sample. The organic phase is stated to by xylenes and is approximately 43% and the aqueous phase is approximately 57%. The organic layer mixes readily with our light ends, and adds just a touch of orange coloring to it. A distillation of this organic layer produces a cloudy but colorless material. The recovery is only 89% and the solution has considerable foaming issues. We will gain nothing by distilling this material except problems. The bottom aqueous layer has a pH of 3 and does not easily treat. The sludge that is formed is very slow to separate out, but it will happen if given enough time. The sludge is also much finer than typical. There are solids in the interface between the two layers that we can either filter out or just treated with the water. They will come out in the sludge. We may want to drain the aqueous layer off the truck and catch the last portion, which will contain the solids, and dump them to a box. This source has the potential receipt of one load per quarter. We can receive this stream and decant off the organic phase, which should be put into our light ends. The bottom aqueous phase should go to our standard water treat, where the solids will come out with the sludge. Metals on the treated water are acceptable. TOC on the water is very high at 34320 ppm.

Below is a summary of the analytical work completed on the above samples.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

EMA Sample Evaluations			
	0508-07	0508-08	0508-09
pH	14		3
solids, vol%	0		5
TOC, ppm (water phase)			34320
NaOH, wt%	5.3		
Density	1.042		
Treatability			Challenging
Metals, ppm			
Cd			0.067
Cr			0.136
Cu			0.071
Ni			0.264
Zn			0.057
Distillation, OH Temp, C			
IBP		77	53
10%		85	123
20%		145	128
30%		167	133
40%		168	133
50%		168	141
60%		168	144
70%		150	148
80%			153
85%			158
89%			160

PRECISION PETROLEUM LABS, INC.

5915 Star Lane Houston, TX 77057
Ph. 713-680-9425 Fax: 713-680-9564

CERTIFICATE OF ANALYSIS

Company:	CES Environmental Services, Inc
Invoice No.:	37912
Lab Reference No.:	2008-06-387
Product ID:	0608-30-5% NAOH
Date Received:	06-12-2008
Authorized By:	Kim Harmon

0508-07

PARAMETER	TEST METHOD	REPORTING LIMIT	TEST RESULTS
Phenol, PPM	G.C./M.S.	1.0	BRL
Inorganic Chloride, PPM	S.M. 4500 CL	1.0	31
Aromatic Volatile Organics, PPM			
Benzene	S.W. 8260	0.010	BRL
Heavy Metals, PPM			
Arsenic	EPA-6010	0.50	BRL
Barium	EPA-6010	0.10	BRL
Cadmium	EPA-6010	0.10	BRL
Chromium	EPA-6010	0.15	BRL
Potassium	EPA-6010	0.14	12.09
Lead	EPA-6010	0.39	BRL
Mercury	EPA-6010	0.17	BRL
Selenium	EPA-6010	0.63	BRL
Silver	EPA-6010	0.13	BRL

- *Excessive sodium content may have effected chloride concentration detection*

Daniel Zabihi
QA Manager
Date:06-13-2008
BRL = Below Reporting Limit

PRECISION PETROLEUM LABS, INC.'S RESPONSIBILITY FOR THE ABOVE ANALYSIS, OPINIONS OR INTERPRETATIONS IS LIMITED TO THE INVOICE AMOUNT.

PRECISION PETROLEUM LABS, INC.

5915 Star Lane Houston, TX 77057
Ph. 713-680-9425 Fax: 713-680-9564

CERTIFICATE OF ANALYSIS

Company:	CES Environmental Services, Inc
Invoice No.:	37912
Lab Reference No.:	2008-06-387
Product ID:	0608-30-5% NAOH
Date Received:	06-12-2008
Authorized By:	Kim Harmon

0508-07

PARAMETER	TEST METHOD	REPORTING LIMIT	TEST RESULTS
Phenol, PPM	G.C./M.S.	1.0	BRL
Inorganic Chloride, PPM	S.M. 4500 CL	1.0	31
Aromatic Volatile Organics, PPM			
Benzene	S.W. 8260	0.010	BRL
Heavy Metals, PPM			
Arsenic	EPA-6010	0.50	BRL
Barium	EPA-6010	0.10	BRL
:dmium	EPA-6010	0.10	BRL
‿hromium	EPA-6010	0.15	BRL
Potassium	EPA-6010	0.14	12.09
Lead	EPA-6010	0.39	BRL
Mercury	EPA-6010	0.17	BRL
Selenium	EPA-6010	0.63	BRL
Silver	EPA-6010	0.13	BRL

- *Excessive sodium content may have effected chloride concentration detection*

Daniel Zabihi
QA Manager
Date:06-13-2008
ˉRL = Below Reporting Limit

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Kelli Lofton, Gary Peterson

Date: 05/14/08

From: Miles Root

Lab Memo: 08-078

Subject: **Enterprise Mont Belvieu Evaluations #0508-18 & 19**

Two samples from Enterprise, Mont Belvieu, East Storage, have been evaluated as potential receipts for processing at CES. These are sample evaluations 0508-18 and 19. Both sources can be accepted and treated at CES, one will be easy and the second a bit more challenging.

Evaluation 0508-18 is a fairly good looking water sample. It has a low TOC of 1261 ppm, pH of 9, a flash point greater than 140 deg F, and acceptable metals on the treated water except for chromium, which is a little high. This can be diluted down, depending upon the volume received. This sample also treats easily and has a typical amount of solids formed, that will not be an issue. I do not know the volume of this source, but any volume will not be an issue. We can accept and treat this source without issues.

Evaluation 0508-19 is a difficult sample. It contains 8% solids, has a pH of 11, has an oily rag type layer of approximately 10% on top which contains no real recoverable oil and has a flash point less than 140 deg F. It will need to be received with the proper hazardous codes due to this fact. The rag layer is not oily feeling and appears to be a light hydrocarbon emulsified with particulates. The treated water also shows slightly elevated chromium levels. This stream will need to be heated and acidified to totally remove the oily rag layer, and it will be difficult to do, at best. When heated, the oily rag produces solids that fall out of solution. Acidification produces considerable foaming and causes the oil rag to form a thick paste which will stick to tanks and equipment. A weak caustic solution containing carbonates would foam very similar to this upon acidification. Again, there will be no recoverable oil from this source, but it must be treated as oil to remove the oily rag and oily solids that are present. I do not know the volume of this source, but we should charge accordingly to account for the considerable time and money that will be spent on this stream. Metals on the treated water are acceptable.

A summary of the analytical work on these two samples is found below.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Enterprise Mont Belvieu		
	0508-18	0508-19
pH	9	11
solids, vol%	0.1	8
TOC, ppm (water phase)	1261	2403
Flash Point, deg F	> 140	<140
Oil, vol	0	10% rag
Treatability	Easy	Difficult
Metals, ppm		
Cd	0.179	0.433
Cr	0.273	0.355
Cu	0.189	0.255
Ni	0.726	1.58
Zn	0.117	0.36

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Kelli Lofton, Gary Peterson

Date: 05/12/08

From: Miles Root

Lab Memo: 08-077

Subject: **Baker Hughes Diesel Evaluation #0508-16**

A sample of diesel from Baker Hughes PMG, Victoria, has been evaluated as a purchase and resale potential for CES. This sample is evaluation 0508-16, and is diesel that has been used to flush a natural gas pipeline.

This sample looks like good diesel. We will not want to mix or blend it with any of our products, but market it "as is". The material is very clean looking and only has the solids on the bottom of the sample jar, that we will not be picking up. We should pursue the acquisition of this material for resale.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Kelli Lofton, Gary Peterson

Date: 05/12/08

From: Miles Root

Lab Memo: 08-074

Subject: **Strike Construction, Kinder Morgan @ BW8, Sample Evaluation #0508-13**

A sample of water from Strike Construction, Kinder Morgan at 249 and Beltway 8, has been evaluated as a potential receipt for processing at CES. This sample is evaluation 0508-13, and is produced from a water flush of a natural gas pipeline. We will be able to receive and process this material without unusual problems.

This sample has a pH of 7, no phenols, a trace amount of solids, a flash point greater than 140 deg F, a low TOC of 1179 ppm, and has low metals on the treated sample. The water treating of this sample produces more than an average amount of solids, but not excessive to where we cannot handle this stream It was also stated that this stream may have some type of oil or hydrocarbons, but this sample had none.

We will be able to receive and treat this sample without unusual issues. A summary of the analytical testing is found below.

Strike Construction	
Evaluation 0508-13	
pH	7
Solids, vol%	trace
Phenols, ppm	0
TOC, ppm	1179
Flash Point, Deg F	>140
Metals, ppm	
Cd	0.066
Cr	0.174
Cu	0.000
Ni	0.191
Zn	0.043

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Kelli Lofton, Gary Peterson

Date: 05/12/08

From: Miles Root

Lab Memo: 08-076

Subject: **Strike Construction, Kinder Morgan, Sample Evaluation #0508-12**

A sample of water from Strike Construction, Kinder Morgan at Sheldon Road, has been evaluated as a potential receipt for processing at CES. This sample is evaluation 0508-12, and is produced from a water flush of a natural gas pipeline. We will be able to receive and process this material without unusual problems.

Two samples were composited for the testing. This composite has a pH of 6, no phenols, 0.4% solids, a flash point greater than 140 deg F, a low TOC of 1364 ppm, and has low metals on the treated sample. It was stated that this stream may have some type of oil or hydrocarbons, but this sample had none.

We will be able to receive and treat this sample without unusual issues. A summary of the analytical testing is found below.

Strike Construction	
Evaluation 0508-12	
pH	6
Solids, vol%	0.4
Phenols, ppm	o
TOC, ppm	1364
Flash Point, Deg F	>140
Metals, ppm	
Cd	0.057
Cr	0.12
Cu	0.033
Ni	0.27
Zn	0.144

CES Environmental
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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Lenertz
Cc: Gary Peterson

Date: 05/01/08

From: Miles Root

Lab Memo: 08-073

Subject: **Shell Yabucoa Caustic Evaluation 0408-88**

A sample of caustic from Shell, Yabucoa has been evaluated as a potential acquisition for CES. This sample is evaluation 0408-88 and is from the caustic extraction of light gasoline.

This sample is pale amber in appearance and is free of any particulates or oils. This material has a density of 1.235, has a NaOH value of 16.88 wt% and sulfide sulfur of 1.1 wt%. The sample was sent to Precision Labs for additional testing. A summary of all the analytical work done on this sample is found in the table below.

Shell Yabucoa	
Evaluation 0408-88	
Density	1.235
NaOH, wt%	16.88
Sulfide, as S, wt%	1.1
TOC, mg/L	15440
Inorganic Cl, ppm	851
Benzene, ppm	0.01
Metals, ppm	
Pb	<.390
Hg	36.585
K	501.800

PRECISION PETROLEUM LABS, INC.

5915 Star Lane Houston, TX 77057
Ph. 713-680-9425 Fax: 713-680-9564

CERTIFICATE OF ANALYSIS

Company:	CES Environmental Services
Invoice No.:	37341
Lab Reference No.:	2008-04-709
Product ID:	Log Bk# 0408-89
Date Received:	04-24-2008
Authorized By:	Kim Harmon

TOTAL METAL	TEST METHOD	PREPARATION METHOD	REPORTING LIMIT, PPM	TEST RESULTS, PPM
Lead	EPA-6010B	EPA-3040/3050	0.390	BRL
Mercury	EPA-6010B	EPA-3040/3050	0.170	36.585
Potassium	EPA-6010B	EPA-3040/3050	1.950	501.800

BRL = Below Reporting Limit

PARAMETER	TEST METHOD	REPORTING LIMIT	TEST RESULTS
Inorganic Halogen, PPM	S.M.4500 CL	1.0	851

Aromatic Volatile Organics, PPM

Benzene	S.W. 8260	0.010	BRL

Daniel Zabihi
QA Manager
Date: 04-25-2008
PREPARATION METHOD: EPA-3040 FOR ORGANICS, EPA-3050 FOR ALL OTHER SOLID MATRICES.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Gary Lenertz, Bo Cumberland, Gary Peterson

Date: 04/28/08

From: Miles Root

Lab Memo: 08-072

Subject: **Targa Evaluation 0408-90**

A sample of flare water from Targa has been evaluated for processing at CES. This sample is evaluation 0408-90. This material is called "flare water" and is a weak caustic that supposedly contains gasoline and disulfide oils. There are approximately two trailer loads of this material available.

This particular sample contained no disulfides or other floating hydrocarbons. Dana indicated that this sample was taken near the bottom of the tank. The gasoline or any disulfides in this caustic would be floating at the top of the tank. Upon receipt of this material it would need to be checked for any hydrocarbons. If present, the water phase could be pumped off and the hydrocarbons sent to the back for processing into black oil. This decision will need to be made upon arrival of this material as there are no hydrocarbons to evaluate in this evaluation sample.

This material treats easily without issues. The phenols are somewhat high at 20 ppm and would need to be diluted with other "good" water in order for it to be discharged after treating at CES. Metals and TOC are acceptable. My main concern with this material is that the evaluation sample may not look like the material that is actually received, especially if the tank has been static for some time. A summary of the completed testing is found in the table below. This sample was initially tested as a caustic stream, and that type of analytical data is included as well.

Targa	
Evaluation 0408-90	
pH	14
Phenols, ppm	20
TOC, mg/L	13245
NaOH, wt%	3.9
RSH, as S, wt%	0.12
Sulfides, as S, wt%	0
Density	1.024
Metals, ppm	
Cd	0.117
Cr	0.183
Cu	0.310
Ni	1.756
Zn	0.470

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Gary Lenertz, Bo Cumberland, Gary Peterson

Date: 04/28/08

From: Miles Root

Lab Memo: 08-071

Subject: **Pre Tec Instruments Evaluation 0408-96**

A sample of used oil from Pre Tec, Brittmore Park, has been evaluated as a potential oil receipt for CES. This sample is evaluation 0408-96. This sample contains approximately 33% oil. A chlor-d-tect test run on the oil phase of this sample is greater than 4000 mg/L. This high value rejects this source from recovery processing at CES.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman
Cc: Marlin Moser, Bo Cumberland, Gary Peterson

Date: 04/24/08

From: Miles Root

Lab Memo: 08-070

Subject: **Adler Box V-246**

Solids from the Adler box V-246 have been thoroughly washed in the laboratory in an attempt to remove benzene. Test results indicate that the initial TCLP benzene content in these solids is low, at 356 ug/L (~ 0.356 ppm) and are reduced to 289 ug/L (~0.289 ppm) with a soapy water washing.

This testing was done in a rather simple manner, but the shaking of the sample was very thorough and complete. A sample size of around 100 g was used for the washing. A water and Alconox soap mixture was prepped in a 1L container along with the solids and thoroughly shaken. This equates to approximately 10:1 soapy water to solids ratio. The soapy water was drained off and a second round of cleaning with another soapy mixture was again performed. Afterwards, the soapy water residue was removed with another rinsing with tap water. The solids were removed from the container and allowed to air dry on a paper towel for around 20 minutes before being bottled up for testing. There was no free water in the solids. The neat solids that were tested were also allowed to sit on a paper towel to absorb any free liquid before being sent for testing.

Samples of the neat solids and the washed solids were tested at Precision Labs for TCLP benzene.

LCS

CLIENT: C E S ENVIRONMENTAL

CLIENT: 0408-76

DATE: 4-24-08
Lab Order: T2008-2058H
Matrix: SOLID

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES TCLP		**SW8260B**				Analyst: **RS**
Benzene	356	20.0		µg/L	1	4/24/2008 1:03:00 AM
Surr: 1,2-Dichloroethane-d4	73.3	60-140		%REC	1	4/24/2008 1:03:00 AM
Surr: 4-Bromofluorobenzene	94.2	80-125		%REC	1	4/24/2008 1:03:00 AM
Surr: Dibromofluoromethane	101	70-140		%REC	1	4/24/2008 1:03:00 AM
Surr: Toluene-d8	72.6	70-130		%REC	1	4/24/2008 1:03:00 AM

NEAT ADLER BOX V-246

Qualifiers: ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits

CLIENT: C E S ENVIRONMENTAL

CLIENT: 0408-77

DATE: 4-24-08
Lab Order: T2008-2059H
Matrix: SOLID

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES TCLP		**SW8260B**				Analyst: **RS**
Benzene	289	20.0		µg/L	1	4/24/2008 1:03:00 AM
Surr: 1,2-Dichloroethane-d4	73.3	60-140		%REC	1	4/24/2008 1:03:00 AM
Surr: 4-Bromofluorobenzene	94.2	80-125		%REC	1	4/24/2008 1:03:00 AM
Surr: Dibromofluoromethane	101	70-140		%REC	1	4/24/2008 1:03:00 AM
Surr: Toluene-d8	72.6	70-130		%REC	1	4/24/2008 1:03:00 AM

WATER AND SOAP WASHED
ADLER BOX V-246

Qualifiers: ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/23/08

From: Miles Root

Lab Memo: 08-069

Subject: **Citation Evaluation Samples 0408-53 thru 56**

Four samples from Citation, Lufkin, have been evaluated as potential receipts for processing at CES. These samples are as follows: containment water, 0408-53; oil, 0408-54; NDT fluid, 0408-55; and a sulfuric acid stream containing DMEA, 0408-56. Overall, we will be able to take all of the mentioned streams, processing them as described below.

The containment water, evaluation 0408-53, according to the evaluation form, may have oil or hydrocarbons, but this sample does not. The water treats easily, has a low TOC, metals and phenols. Since this stream may arrive with hydrocarbons, any type of diesel, oil or gasoline that may come in with this water would need to be recycled.

The mixture of lube and mineral oils, evaluation 0408-54, is good looking light colored oil. This oil has an ash of only 0.05% with a chlor-d-tect of 200 ppm. A flash point of greater than 140 deg F and a density of 0.846 makes this a potentially good candidate for base oil.

The NDT fluid, evaluation 0408-55, contains approximately 33% recyclable oil. The neat sample appears to be an emulsion but breaks easily with just a little acid and essentially no heat. The oil separates out cleanly. The water phase treats easily. The water after treatment shows high copper that can be diluted with "good" water and processed. All of the other metals are okay. Phenols and TOC are also good. The oil has a density of 0.890 and can be blended into black oil without issues. The chlor-d-tect of only 100 ppm is very low.

The sulfuric acid stream containing DMEA, evaluation 0408-56, does not treat well. The initial pH of 1.3, when adjusted higher with lime forms a heavy sludge. Ammonia is also heavily liberated when this sample is pH adjusted with lime. The TOC on the water is 65,200, a rather high value, and to be expected. The metals are acceptable. There is a potential for receiving only 2-3 totes per month of the stream, so it can most likely be blended down with our other process water, if we can effectively handle the ammonia issue.

The table below is an analytical summary of the testing completed on the Citation evaluation samples.

CES Environmental
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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Citatation Evaluation Samples Summary				
	0408-53	**0408-54**	**0408-55**	**0408-56**
Water				
pH	6		9	1.3
solids, vol%	0		0	
TOC, mg/L	1261		5945	65200
Phenols	0		0	0
Flash Point	>140 deg F			
Metals				
Cd	0.060		0.065	0.000
Cu	0.064		2.876	0.133
Ni	0.290		0.343	0.836
Zn	0.130		0.144	0.000
Oil			33%	
Density		0.846	0.89	
chlor-d-tect		200	100	
Flash Point		> 140 deg F		
Ash, wt%		0.05		

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/23/08

From: Miles Root

Lab Memo: 08-068

Subject: **Delta Chemical Evaluation 0408-74**

A sample of water from Delta Chemical on Sheldon Road has been evaluated as a potential receipt for processing at CES. This material is from a rail pit sump that collects rainwater and oil. This particular sample has no oil and is acceptable water for our processing. The sample treats easily, the TOC is low, metals are acceptable, solids are trace amount and phenols are only 6 ppm. There will be no abnormal handling procedures that will require additional costs for processing this stream. The table below summarizes the analytical work performed on this sample.

Delta Chemical	
Evaluation 0408-74	
pH	9
Solids, vol%	Trace
Oils, vol%	0
TOC, mg/L	1828
Phenols, ppm	6
Metals, ppm	
Cd	0.064
Cu	0.077
Ni	0.421
Zn	0.978

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/21/08

From: Miles Root

Lab Memo: 08-067

Subject: **National Equipment Evaluation 0408-69**

A sample of oily water from National Equipment, Brennam, has been evaluated as a potential receipt for processing at CES. This material is generated from equipment fluid changes and the washing of machine grindings. This material has the potential of only three drums per year. The oil looks good for recycling into black oil and the water treats easily and has no issues. This particular sample contains approximately 20% oil by volume. Handling drums is more labor intensive so the charges for this material should reflect this. The table below summarizes the analytical work done on both the oil and water phases.

National Equipment Evaluation 0408-69	
pH	6
Phenols, ppm	2
Solids, vol%	<1
Chlor-d-tect, mg/L	800
TOC, mg/L	1450
Metals	
Cd	0.057
Cu	0.022
Ni	0.236
Zn	0.136

CES Environmental Services, Inc.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/21/08

From: Miles Root

Lab Memo: 08-066

Subject: **National Oil Well Evaluation 0408-62**

A sample of wash water from National Oil Well, GamAlloy, has been evaluated as a potential receipt for processing at CES. This material is generated from the washing down of machine equipment. This material is an aqueous solution with a pH of 6. The evaluation form states that it may have up to 2% oil, but this sample has no oil. It does have a sludge layer of approximately 10% that is very dense and heavy. This is most likely the dirt and shavings from the washing process. This stream will need to be filter pressed at an extra cost to remove these solids. The water treats easily and there are no other issues with this stream. The analytical summary is shown below.

National Oil Well	
Evaluation 0408-62	
pH	6
Phenols, ppm	0
Solids, vol%	10
Flash Point, deg F	>140
TOC, mg/L	1649
Metals	
Cd	0.083
Cu	0.026
Ni	0.344
Zn	0.157

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/21/08

From: Miles Root

Lab Memo: 08-065

Subject: **C4 Environmental - DSI Chemical Evaluation 0408-70**

A sample of weak caustic from C4 Environmental - DSI Chemical, Houston, has been evaluated as a potential receipt for processing at CES. This material is alkaline water from a product wash. This material analyzes as 1.8% caustic as NaOH. It has a pH of 14, indicating that it will be classified as a hazardous waste. The TOC of 1282 mg/L is low and this material contains no phenols. The metals are acceptable.

This material will be best treated by mixing with our "normal" water streams and going through our water treatment processing. It will consume slightly more acid but the caustic strength is not too high to be of any major issue. This sample treats easily in the lab. A base price of $0.1/gal should cover our basic chemical costs, as additional acid for treating is minimal. The metals summary is shown below.

C4 Env - DSI Chem	
Evaluation 0408-70	
Metals	
Cd	0.125
Cu	0.007
Ni	0.726
Zn	0.647

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Lenertz
Cc: Gary Peterson, Bo Cumberland

Date: 04/17/08

From: Miles Root

Lab Memo: 08-064

Subject: **P-Chem Amines Evaluation 0408-58**

A sample of amines from P-Chem, Latexo, TX, has been evaluated as a CES fuels sales product. This evaluation form states that this material contains 70% DETA and 30% AEEA.

Ash on this sample is 0.12 wt%, density is 1.010 and BTU value is 11,597. The BTU value was obtained by using a benzoic acid tablet and combusting the sample, which is unusual for a sample having this high of a BTU value. The neat sample did not ignite in two consecutive attempts. The BTU value added by the benzoic acid was deducted from the total.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/16/08

From: Miles Root

Lab Memo: 08-063

Subject: **P-Chem Evaluation 0408-52**

A sample of water from P-Chem, Latexo, TX, has been evaluated for potential processing at CES. This sample, evaluation 0408-52, represents condensate water from an amine recovery system. The evaluation form states that this water may contain up to 10% amines. Overall, this material must be processed at System 1 due to the high amine content which will cause ammonia issues with the city of Houston as it is bio-degraded.

Analysis shows this water to have 0.7% "oil", which is actually the amines that are insoluble in water, and not oil. Primary and secondary amines with four or five carbons are totally miscible with water but tertiary amines are only slightly miscible in water, at best. While I do not know what amines are actually recovered in this process I can formulate that the majority are not tertiary, based upon solubility. These amines are responsible for giving this water a pH of 11. The water treats fine, has low metals, a high flash point, and an acceptable TOC, but the degradation of amines to ammonia will keep us from processing this material at our plant site. This source must be processed at System 1, and meets all analytical requirements for it to do so. Price this stream accordingly to account for this additional handling. Below is the analytical summary for the testing on this water.

P-Chem Evaluation 0408-52	
pH	11
Oil, vol%	0.7
TOC, mg/L	12165
Flash Point	>140 deg F
Metals	
Cd	0.105
Cu	0.369
Ni	1.004
Zn	0.499

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/16/08

From: Miles Root

Lab Memo: 08-062

Subject: **Ineos Polymers Evaluation 0408-49**

A sample of oil from Ineos Polymers has been evaluated for potential acquisition and sale by CES. This sample, evaluation 0408-49, represents 650 gallons of synthetic Mobil oil. This oil looks as though it has the potential to be sold as base oil.

Analysis shows this oil to have no ash, a flash point greater than 140 deg F, a chlor-d-tect of 1500 mg/L, and an API gravity of 31.4 at ambient temperature. It is pale amber in appearance and is free of any particulates or sludge. It mixes well with black oil, but we do not have a sample on hand of base oil to see how it blends. It is oil, so it should have no problems blending with any base oil. There are no offensive odors and this oil looks very good. I recommend we obtain and market this oil, preferably into the base oil market.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/14/08

From: Miles Root

Lab Memo: 08-061

Subject: **Delta Chemical Caustic Evaluation 0408-40 - Updated**

A sample of caustic from Delta Chemical, Deer Park, has been evaluated for potential use as caustic by CES. This sample, evaluation 0408-40, represents material that has been in tank storage for two years, and may contain a small amount of acetic acid. Overall, this material should be obtained as a caustic stream and used as such. Using it as water will cause issues.

This material analyzes by titration to be 5.1 wt% caustic, as NaOH. The measured density of 1.066 is slightly greater than the density found in literature for this concentration, but it would make sense if it does have some acetate salts, resulting from mixing acetic acid and caustic. The acetate group having a higher molecular weight than the hydroxyl group would account for the slightly higher density. This material also contains a small amount of brownish orange solids, approximately 0.3 vol%. These solids are not rust, as a magnet does not attract them. They look to be particulates, but they are unknown at this time. They do settle out within a couple of hours after being mixed. The resulting caustic is near water white in appearance.

Treating this material as a water receipt will mean it will be classified as a hazardous waste, as the pH is 14. Metals were run on the neat sample and a treated sample. The treat for this material is not recommended, as the reaction of sulfuric and caustic is rather violent. This sample also produces considerably greater than typical solids. This material contains greater than 2 ppm of zinc, which means it must be diluted with our "good" water. The high pH also means it would need to be processed gradually in order not to exceed our pH discharge limit. I don't believe that treating this with sulfuric and lime is either wise or cost effective, even though the zinc is reduced in concentration. The table below shows the neat and treated metals on this sample. The pH will be the major issue and not the metals.

My recommendation is to obtain this material as a caustic and send to KMTEX to be sold as caustic. The solids are below the DeRidder specifications, so this material does not even need to be filtered. Secondly we may choose to classify this material as a hazardous waste and bring into the plant. We would need to process this material by considerable dilution. This would require a separate tank for storage and special handling. If this is the option chosen, it should be priced accordingly to account for these requirements.

Metals Summary		
Metals	Neat	Treated
Cd	0.312	0.262
cu	0.455	0.393
Ni	1.344	1.236
Zn	3.896	0.257

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/14/08

From: Miles Root

Lab Memo: 08-061

Subject: **Delta Chemical Caustic Evaluation 0408-40**

A sample of caustic from Delta Chemical, Deer Park, has been evaluated for potential use as caustic by CES. This sample, evaluation 0408-40, represents material that has been in tank storage for two years, and may contain a small amount of acetic acid. Overall, this material should be obtained as a caustic stream and used as such.

This material analyzes by titration to be 5.1 wt% caustic, as NaOH. The measured density of 1.066 is slightly greater than the density found in literature for this concentration, but it would make sense if it does have some acetate salts, resulting from mixing acetic acid and caustic. The acetate group having a higher molecular weight than the hydroxyl group would account for the slightly higher density. This material also contains a small amount of brownish orange solids, approximately 0.3 vol%. These solids are not rust, as a magnet does not attract them. They look to be particulates, but they are unknown at this time. They do settle out within a couple of hours after being mixed. The resulting caustic is near water white in appearance.

My recommendation is to obtain this material as a caustic and send to KMTEX to be sold as caustic. The solids are below the DeRidder specifications, so this material does not even need to be filtered.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/14/08

From: Miles Root

Lab Memo: 08-060

Subject: **TX Blending Sample Evaluation 0408-42**

A sample of water from TX Blending, Houston, has been evaluated for potential processing at CES. This sample, evaluation 0408-42, consists of rainwater that has been collected in a pit. Overall, this material looks good and is a stream that we can process at CES.

This water treats easily, has a neutral pH, low TOC and metals. The solids look like dirt. There is no oil or even an oil sheen present on the sample. There will be no extra processing that will need to be done on this sample, so price accordingly. The table below summarizes the testing done on this water sample.

TX Blending	
Evaluation 0408-42	
pH	7
Solids, vol%	2
TOC, mg/L	1221
Oil, vol%	0
Metals, ppm	
Cd	0.097
Cu	0.099
Ni	0.353
Zn	0.136

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman
Cc: Gary Peterson, Bo Cumberland

Date: 04/10/08

From: Miles Root

Lab Memo: 08-059

Subject: **Kinder Morgan Sample Evaluation 0408-32**

A sample from Kinder Morgan, Galena Park, has been evaluated for potential processing at CES. This sample, evaluation 0408-32, consists of a liquid and solid phase. This particular sample is approximately 70% solids. This sample stream can be handled with special processing at CES.

The main issue with this material is the flash point, which is greater than 130 deg F but less than 140 deg F. The water treats easily and has a low TOC, no phenols and a pH of 7. Metals on a treated water sample are also acceptable. The low flash point on the water means this will need to be processed in our oil facility. The solids from this source will need to be stabilized with another material such as diatomaceous earth or sawdust in order for them to pass the Paint Filter test. This is essentially mixing the solids so that no free liquid characteristic will be exhibited according to SW-846 Method 9095. I believe that this can be done.

The solids do not readily mix with our black oil but a portion of them seem to solubilize in the oil over time. They appear to be a mix of both organic and inorganic materials. They are compacted and fairly dense in the sample container and the vast majority of the liquid can be poured away from the solids as well. Adding and mixing a stabilizer such as saw dust or diatomaceous earth is a solution to disposal of these solids in our Class 2 bins.

Below is the analytical summary of the testing performed on the water phase of this sample.

Kinder Morgan	
Evaluation 0408-32	
pH	7
TOC, mg/L	1562 mg/L
Phenols	0
Flash Point	<140 deg F
Metals	
Cd	0.11
Cu	0.191
Ni	0.038
Zn	0.217

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/09/08

From: Miles Root

Lab Memo: 08-058

Subject: **ATMI Evaluation 0408-020**

An aqueous sample from ATMI, Burnet, TX has been tested for potential processing at CES. This water stream originates from tank cleaning and is evaluation 0408-20. The MSDS sheet accompanying the sample indicates is may contain such compounds as water, diethylene glycol monobutyl ether, ethanolamine, 1-methyl 2-pyrrolidinone, butyrolactone, catachol, ethylene glycol and butyl carbitol. The percentages vary widely for each of these compounds.

The sample smells strongly of ammonia and a quick test for ammonia shows 30 mg/L as ammonia. We cannot process large quantities of ammonia type compounds at CES. This odor comes from the ethanolamine. Ethanolamine is typically used as a scrubbing solution for specific acid gases such as hydrogen sulfide and carbon dioxide. Its properties allow these gases to be released when heated so that the solution, which is a weak base, can be reused. A heated sample shows negative for any hydrogen sulfide release but does produce a very strong ammonia odor. This sample also contains no solids or oils.

The MSDS sheet also indicates the annual volume of this material is 1200 gallons. This small volume indicates that this material may be able to be blended down with our good water. This must be balanced with the fact that this sample may not be representative of future receipts due to the wide variation of compounds as indicated on the MSDS sheet. These are the concerns that I have with this stream. This material does have a flash point greater than 140 deg F and a pH of 11, so it can go to Newpark for disposition, if needed. The main issue is that we cannot process large volumes of ammonia producing streams at CES.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/08/08

From: Miles Root

Lab Memo: 08-057

Subject: **Packless Industries Water Evaluation 0408-021**

A sample of water from Packless Industries, Waco, TX has been tested for potential processing at CES. This waste water stream originates from the cleaning of copper tubing. This stream is high in copper, as would be expected. The water after treatment still contains 5 ppm copper, well above our 2 ppm limit. This would require dilution by mixing with other low metal water for processing. This special handling needs to be taken into account when pricing this stream. The water treats fairly easily and produces an above average amount of solids. This also should be taken into account for pricing. All other parameters look acceptable. A summary of the analytical results is below.

Packless Industries	
Evaluation 0408-21	
pH	8
Solids %	0.1
Phenols, ppm	o
TOC, mg/L	9065
Oil	0
Metals, ppm	
Cd	0.037
Cr	0.345
Cu	5.019
Ni	0.573
Zn	0.158

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/08/08

From: Miles Root

Lab Memo: 08-056

Subject: **Taylor Press Products Evaluations 0408-018-19**

Two samples of water from Taylor Press Products, Jarrell, TX, have been tested for processing at CES. These streams consist of rinse water prior to and after a painting process known as autophoretic painting. Autophoretic painting is simply a process used to deposit paint to be used typically as a corrosion inhibitor to metals. It is an alternative to galvanizing. These water samples look good. They contain no oils, minimal solids, have low TOCs and metals and the water treats easily. They contain no paint. Should there actually be any paint in these samples at some point in time it might cause issues with our processing, and this would be non conforming material. A summary of the analytical test results is below.

Taylor Press Products		
	DI water Stage 4	Rinse Water Stage 6
	Eval 0408-018	Eval 0408-019
pH	8	5
Oil	0	0
Solids	0	0.1
TOC	1331	1217
Metals		
Cd	0.033	0.034
Cr	0.063	0.171
Cu	0.075	0.106
Ni	0.229	0.353
Zn	0.055	0.113

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/08/08

From: Miles Root

Lab Memo: 08-055

Subject: **Southwest Shipyard Evaluations 0408-022-25**

Several samples of oil and water from Southwest Shipyard have been evaluated for potential processing at CES. These samples are evaluations 0408-22 thru 25 and cover 14 individual samples. These samples were composited and a treatability run on the water phase and the oil phases tested. The pH values on the individual water samples are in either the 11 or 2 pH range. Our hazardous waste permit will now allow us to receive these low pH waters. Some of the water samples have oil layers and a single tank sample, T-633, is all oil. An equal volume composite of all samples contains approximately 30% oil. The oil is cleaning looking and will go to black oil sales. The water treats easily and is low in metals and TOC. Pricing on the water tanks should be at least $.10/gallon. The oil will go into black oil sales. Pricing should be no more than $.40/gallon and would be best purchased on a sliding scale going down from there as the quality potentially decreases. A summary of the analytical test results on the composite sample is below.

Southwest Shipyard	
Evals 0408-22-25	
Oil	
Chlor-d-tect, mg/L	1000
Flash Point	>140 deg F
Water	
pH	9
TOC, mg/L	2600
Solids	Trace
Oil	30%
Metals	
Cd	0.059
Cu	0.108
Ni	0.558
Zn	0.212

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/07/08

From: Miles Root

Lab Memo: 08-054

Subject: **Calpine Water Evaluations 0408-014-15**

Two samples of water from Calpine have been tested for processing at CES. These streams are evaluations 0408-14, Frac Tank 259530, and 0408-15, Frac Tank 239454. Both of these streams are acceptable for processing at CES. They both have low TOCs, phenols and metals and easily treat. They are free of particulates and oils. We should have no issues processing these waters. A summary of the analytical test data is found below.

Calpine Evaluations		
	0408-14	0408-15
ph	9	9
Solids	0	0
Oils	0	0
Phenols, ppm	0	0
TOC, mg/L	2046	2249
Metals, ppm		
Cd	0.068	0.063
Cr	0.276	0.329
Cu	0.22	0.152
Ni	0.488	0.292
Zn	0.106	0.076

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/03/08

From: Miles Root

Lab Memo: 08-053

Subject: **Enterprise Oil Tanking Evaluation 0408-011**

A sample of contaminated water from Enterprise Oil Tanking has been tested for processing at CES. This stream represents collected rainwater that is contaminated with machine oils. This particular sample has only a partial oil sheen, but the evaluation form indicates a possible two to five percent of oil may be possible in this stream. This water treats easily, has a flash point greater than 140 deg F, is acceptable in metals, contains no phenols, and has a low TOC. We should process this material by drawing off the oil free water from the bottom of the trailer and move any oil layer to the back for processing. The analytical summary is found below.

Enterprise Eval 0408-011	
pH	7
Oil	Sheen
Solids	0
Phenols	0
Flash Point	>140 deg F
TOC, mg/L	874
Metals, ppm	
Cd	0.008
Cr	0.000
Cu	0.005
Ni	0.022
Zn	1.458

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 04/01/08

From: Miles Root

Lab Memo: 08-052

Subject: **Afton Chemical Evaluations 0308-121 – 125**

Samples of viscosity improvers from Afton Chemical have been tested for compatibility with our black oil and light ends. Ash analyses have also been determined on two of the samples by an outside lab. All of the materials were compatible with the requested testing with either light ends or black oil. The HiTEC 9227 has a very high ash at 13.1 wt%. This entire spectrum of material is available in a lot of approximately 1000 drums that are partially filled with the various evaluation materials. All of the samples look clean and since they are in drums are able to be blended as needed to reduce the high ash content in the one stream. A summary of the test results is below.

Afton Chemicals Evals 0308-121 thru 125			
Eval #	Sample ID	Compatibility	Ash, wt%
0308-121	HiTEC 9227	Black Oil	13.1
0308-122	HiTEC 343	Black Oil	1.7
0308-123	HiTEC 5777	Light Ends	
0308-124	HiTEC 6560	Black Oil	
0308-125	HiTEC 5710A	Light Ends	

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Lenertz
Cc: Marlin Moser, Gary Peterson, Bo Cumberland

Date: 04/01/08

From: Miles Root

Lab Memo: 08-051

Subject: **Exxon Mobil Naphthenic Caustic Evaluation 0308-87**

A sample of naphthenic caustic from Exxon Mobil, Baton Rouge, has been evaluated to determine the quality and quantity of recoverable nap acid. The table at the end of this report also contains data for all neutralization steps so that acid and caustic quantities may be calculated for this processing on a plant scale basis. The final work shows that this sample contains 4.7% of crude nap acid with a total acid number of 152. The process may present some challenging odor issues but is otherwise fairly easy and straight forward.

Testing/Observations

Four one liter samples were composited and a known weight acidified to a pH of 2 with CES plant grade sulfuric acid. The sprung crude nap acid and brine were separated after the sample was allowed to sit for approximately one hour. A portion of the nap acid was water washed with a ratio of 3:1, water to nap acid. The nap acid was tested for total sodium before and after the water washing procedure. Total acid number was determined on the water washed nap acid. The brine was adjusted to a pH of 5 with 50% caustic. TOC and phenols were tested on the pH adjusted brine along with total benzene. The volumes of both acids and caustics used in these procedures were recorded. These volumes are summarized below along with the analytical summary.

This procedure went very smoothly. The nap acid is sprung out of the caustic solution with a fair amount of odors and is a non violent type of reaction. Odors are very subjective so this must be kept in mind. There is a fairly quick and clean separation of the nap acid from the brine. The water washing of the nap acid does take some time for the final phase separation to remove the water. On this small scale an hour was allowed and it seemed to be sufficient. On a plant scale I would initially allow several hours for this procedure. This water washing step is the slow point in the processing of this material.

Test results on the various produced streams show the nap acid to have a total acid number of 152. The neat nap acid has a total sodium of 4769 mg/L and the water washed nap acid contains 3998 mg/L. The phenols on the brine are 300 ppm. The TOC is 5400 mg/L. The water from the nap acid wash has a phenols content of 3125 ppm with a TOC of 81100 mg/L.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

Conclusions

This procedure went very smoothly with the water washing of the nap acid step being the slow point. The phenols on the brine are amazingly low and the TOC is a very manageable value as well. The water washing step creates challenges with the water produced both in phenols and TOC. The nap acid odor is unique and may be offensive to some, and this will be another odor challenge to overcome. The metallurgy for this type of processing will need to be specialized to handle the extremely low pH involved. None of the above are challenges that cannot be overcome.

Exxon Mobil Naphthenic Caustic	
wt of naphthenic caustic for testing, grams	2400
mL of plant sulfuric for neutralization to pH 2	113.4
Recovered nap acid, wt%	4.66
mL of 50% NaOH to adjust brine to pH 5	19
Phenols on pH adjusted brine, ppm	300
TOC on ph adjusted brine, mg/L	5400
total benzene on pH adjusted brine, ppm	<0.1
TAN on water washed nap acid, mg KOH/g	151.53
Total sodium on neat nap acid, mg/L	4769
Total sodium on water washed nap acid, mg/L	3998
TOC on water from nap acid wash, mg/L	81100
Phenols on water from nap acid wash, ppm	3125

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/31/08

From: Miles Root

Lab Memo: 08-050

Subject: **Select Environmental Evaluation 0308-112**

A sample of oil/water from Select Environmental has been evaluated for potential processing at CES. This oil/water comes from refrigerant oil that contains ammonia, as would be used in a cooling system. It is called Frick oil. This oil/water mix can be separated by centrifuge into a water and oil layer. As a neat sample it is only one phase. It contains approximately ten percent water by centrifuge technique. This material has a chlor-d-tect of only 900 mg/L, a flash point greater than 140 deg F and has good compatibility with our black oil.

This material does have a strong ammonia odor. Joy indicated there were only 20 drums of this material. A 4:1 blend of this material and our typical black oil has no apparent ammonia odor, so it should be blended off. Also, since this material will be coming in drums it will require additional handling vs. a trailer of material, and the supplier should be charged accordingly. An ash was not performed since our furnace is out today. Since this material needs to be blended, any ash will be diluted with other black oil. Overall, we should pursue the acquisition of this material and then blend with our black oil for sales purposes. The analytical test results are summarized below.

Select Environmental	
Evaluation 0308-112	
Density	0.865
API	32
chlor-d-tect, mg/L	900
water by centrifuge, %	10
flash point	>140 deg F

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/31/08

From: Miles Root

Lab Memo: 08-049

Subject: **Honeywell Bryan Water Evaluation 0308-66-67**

A sample of water from Honeywell in Bryan Texas has been evaluated for potential processing at CES. This water comes from a distillation processing of hydrofluoric acid and may contain percentage values of fluorides. This particular sample does not. This water treats easily and has low metals content. The 8% solids on the neat sample will settle out upon standing. A total dissolved solids (TDS) type of testing was performed by gently evaporating away the water from a weighed crucible and reweighing. The main issue with this stream will be whether or not we can process material with potentially high fluorides. The evaluation request form states that this stream may contain up to 2% fluorides. The analytical test results are summarized below.

Honeywell Eval 0308-66-67	
Oil %	0
pH	8
TOC	1239
Solids, vol%	8
TDS %	2.3
Fluoride, mg/L	77
Metals, ppm	
Cd	0.054
Cr	0.153
Cu	0.098
Ni	0.294
Zn	0.088

PRECISION PETROLEUM LABS, INC.

5915 Star Lane Houston, TX 77057
Ph. 713-680-9425 Fax: 713-680-9564

CERTIFICATE OF ANALYSIS

Company:	CES Environmental Services, Inc
Invoice No.:	37021
Lab Reference No.:	2008-03-720
Product ID:	0308-93 3-26-08
Date Received:	03-26-2008
Authorized By:	Miles Root

Parameter	Test Method	Reporting Limit Mg/L	Test Results
Fluorides	S.M. 4500-F-C	1.0	76.7

Daniel Zabihi
QA Manager
Date:03-28-2008
BRL = Below Reporting Limit

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/27/08

From: Miles Root

Lab Memo: 08-048

Subject: **Stewart & Stevenson Oil Evaluation 0308-107**

A sample of oily water from Stewart & Stevenson on I-10 has been evaluated for potential processing at CES. This oil comes from an oil water separator used to process oily water from a wash bay. The oil has a chlor-d-tect of 500 ppm and a flash point greater than 140 deg F. The water has a pH of 8, a TOC of 1070 mg/L and phenols of only 1 ppm. The oil phases out fairly well from the water upon standing but obviously phases out much quicker when centrifuged. This oil source looks good for recycle at CES and its acquisition should be pursued.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/26/08

From: Miles Root

Lab Memo: 08-047

Subject: **SW Shipyard Evaluation 0308-82**

A sample from SW Shipyard has been evaluated for potential processing at CES. This sample, evaluation 0308-82, is a sludge resulting from the processing of the heels of barges. Several attempts to break out any oil and water in this sample were not successful. Heat or heat with acidification only resulted in the material becoming more like a thick pudding, with no phase separations forming in the sample. Centrifugal spinning of the material also did not break out any water and oil layers. Unfortunately, we cannot successfully process this material using any of our conventional treating techniques.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Lenertz

Date: 03/26/08

From: Miles Root

Lab Memo: 08-046

Subject: **KMTEX Distillations**

Two samples from KMTEX have been distilled and the overhead temperatures recorded at 10 mL increments. The two samples are evaluations 0308-94, KMTEX OH, and 0308-95, KMTEX Btms. The overhead sample was mostly aqueous and the distillation showed a small hydrocarbon layer distilling first. The temperature rising above 100 deg C is a heavier boiling material that is water soluble, as there were no distinct layers in the distillate. The Btms sample was distilled to the limit of the thermometer used in the testing and I was only able to distill 50% of the feed. This material is very high boiling. The distillation data for both of these samples is summarized below.

	KMTEX OH	KMTEX Btms
	Eval 0308-94	Eval 0308-95
% Recovery	OH Temp Deg C	OH Temp Deg C
IBP	83	173
10	100	202
20	100	218
30	100	230
40	100	240
50	101	246
60	102	
70	105	
80	196	
90	196	
95	193	

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Lenertz, Matt Bowman

Date: 03/26/08

From: Miles Root

Lab Memo: 08-045

Subject: **KMTEX T-607 TOC Testing**

TOC values have been determined on four KMTEX T-607 samples and a Citgo CCL 20 barge sample. A summary of the test results is found below.

Sample ID	TOC, mg/L
T-607 03/18/08 Eval 0308-100	4882
T-607 03/19/08 Eval 0308-101	14160
T-607 03/22/08 Eval 0308-102	14690
T-607 03/24/08 Eval 0308-103	14075
Citgo CCL 20 Eval 0308-104	13595

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/25/08

From: Miles Root

Lab Memo: 08-044

Subject: **Fujitec Used Oil Evaluation 0308-89**

A sample of used oil from Fujitec has been tested by the chlor-d-tect method and has a value of less than 100 mg/L. Sample is free of any water layer, solids or other abnormalities. This oil sample looks good for acquisition.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/24/08

From: Miles Root

Lab Memo: 08-043

Subject: **Hydrochem Water Evaluation 0308-88**

A sample of water from Hydrochem, Deer Park has been evaluated as a potential receipt for treatment at CES. This water is from the chemical cleaning of an exchanger and is evaluation 0308-88. This sample treats easily, has low TOC, phenols, and solids. We should pursue the acquisition of this stream. This sample came with a lab report showing metals analysis including lead as 27.6 mg/L. We will need to dilute this stream with our other "good" water in order for it to be discharged. Our regular five metals analyzed to be low in a treated sample of this water. The analytical test results for this sample are summarized below.

Hydrochem	
Evaluation 0308-88	
pH	10
Solids %	0
TOC, mg/L	1112
Phenols, ppm	0
Metals	
Cd	0.000
Cr	0.062
Cu	0.051
Ni	0.259
Zn	0.058

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/20/08

From: Miles Root

Lab Memo: 08-042

Subject: **Nucor Oil Evaluations 0308-72 & 73**

Two samples of oil from Nucor have been evaluated as potential acquisitions for CES. These two samples are evaluation 0308-72, Nucor storage, and evaluation 0308-73, Nucor maintenance. Both samples look good and have similarities, with the maintenance sample having more ash and a higher chlor-d-tect value. Both samples streams are recommended for acquisition and a summary of the analytical testing is below.

	Nucor Evaluations	
	0308-72	0308-73
	Storage	Maintenance
Density	0.8614	0.8677
API Gravity	33	32
Flash Point	> 140 Deg F	> 140 Deg F
Ash, wt%	0	0.64
Solids	0	0
Chlor-d-tect, ppm	500	900

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/19/08

From: Miles Root

Lab Memo: 08-041

Subject: **USES Oil Evaluation 0308-71**

A sample of oil from USES at Magellen, Galena Park has been evaluated as an oil receipt. This sample, evaluation 0308-71, represents material from cleaning a #6 fuel with diesel. This material looks good. It has no ash, a flash point greater than 140 deg F, a chlor-d-tect of 200 and only a trace of solids, which were spun out by centrifuge. Density of this sample is 0.905 at ambient temperature, which correlates to an API gravity of 25. This material looks very good for acquisition.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/19/08

From: Miles Root

Lab Memo: 08-040

Subject: **Rineco Sample Evaluation 0308-70**

A sample of water from Rineco - Schlumberger Rosharon has been evaluated for receipt and processing at CES. This material is evaluation 0308-70 and represents rainwater runoff from a secondary containment around a test rig.

This water looks very good for processing. There are no phenols, the metals and TOC are low, and the sample treats easily. Pricing should be at least ten cents per gallon plus transportation charges if we are hauling it. The analytical test results are summarized below.

	Eval 0308-70
	Rineco
pH	6
Phenols	0
TOC	1415
Metals	
Cd	0.049
Cr	0.158
Cu	0.085
Ni	0.185
Zn	0.091

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/17/08

From: Miles Root

Lab Memo: 08-038

Subject: **Champion Technologies Sample Evaluations 0308-58 and 59**

Two samples from Champion Technologies, Fresno, have been evaluated as potential receipts at CES. These two samples represent evaluations 0308-58, tank 7907 and 0308-59, tank 7906, respectively. An equal volume composite was made of these two samples since they looked identical. Both have an organic looking layer on top representing less than 1% oils. The sample was heated and acidified and the top layer removed before the water treat. Not doing this keeps the organics as a floating layer through the process. The treated water has a high zinc content of 5.7 mg/L, but this can be diluted down with other low metals process water. Flash point is 125 deg F, but that is not an issue with our new hazardous waste permit. It will come in under a D001 code and be processed in the back to remove the organics. A table summarizing the test results is shown below.

Champion Technologies	
Evals 0308-58 & 59	
pH	5
Phenols	10 ppm
Flash Point	125 deg F
TOC	7485
Solids	0
Metals	
Cd	0.184
Cr	0.247
Cu	0.244
Ni	0.200
Zn	5.7

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Services, Inc.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/17/08

From: Miles Root

Lab Memo: 08-037

Subject: **NOV and Crescent Drilling Sample Evaluations 0308-08 and 09**

Samples from NOV Rig Solutions and Crescent Drilling have been evaluated as potential receipts at CES. These two samples represent evaluations 0308-08 and 0308-09 respectively. Overall, both of these samples look okay for processing. The NOV sample contains approximately 10% oil for recovery while the Crescent Drilling sample has a partial sheen of oil. Both samples treat okay and the metals on both treated samples are acceptable. A summary of the analytical results are shown in the table below.

	0308-08	0308-09
	NOV Rig Solutions	Crescent Drilling
Chlor-d-tect	300	NA
pH	7	8
Oil %	10	0
Phenols	0	0
Solids %	5	10
TOC	1308	1315
Metals		
Cd	0.075	0.077
Cr	0.103	0.064
Cu	0.078	0.039
Ni	0.427	0.481
Zn	0.189	0.685

Miles Root

From: Miles Root
Sent: Tuesday, March 11, 2008 6:59 PM
To: Joy Baker
Cc: Miles Root
Subject: Select Environmental

Joy, Godfrey is running the TOC and metals on the treated water sample from this Select Environmental sample tonight, so I'll have him give you a call when he has it done. The solids on the water/oil phase are 15% by volume. This is done by centrifuge. The chlor-d-tect on the oil is 1800. There really is no recoverable oil from this sample, as it just has an oily sheen. We will need to treat this sample with heat and acid in order for it to be usable when it arrives, otherwise it will not be acceptable for discharge to the city. When acidifying the sample there were some salts that fell out of solution, that appeared to be water soluble. After treat with lime and polymer the sample takes a long time to phase out, but it eventually does. There are more than the typical amount of solids that form, but that is just a qualitative judgment on my part. We can still take this material, assuming the metals are not really high and the TOC is reasonable. I believe that Godfrey will also run phenols.
Marlin came by and now I have more distillations to do in the morning, and that's why I figured I'd better just sit down and write this up now.
Samples/analysis you asked for have been sent out to the outside testing lab as well.

Miles

EUAL 0308-37

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/13/08

From: Miles Root

Lab Memo: 08-036

Subject: **Rineco-Schlumberger Rosharon Evaluation 0308-49**

A sample of water from Rineco-Schlumberger Rosharon has been evaluated as a potential receipt for processing at CES. This sample, evaluation 0308-49, is described as neutralized process water. This sample is probably neutralized with sodium bicarbonate; at it foams considerably when acidified for the water treatability. This source does have an issue with high phenols, at 38 ppm, but we can treat this with bleach. Solids are also 18% by the centrifuge technique. We can handle the solids but pricing should include this additional handling. We have the option of treating the phenols with bleach or sending the water to Newpark. I recommend we treat with bleach at CES, so this s tream should be priced accordingly. A summary of the test results is found below.

Rineco Evaluation 0308-49	
pH	9
Phenols, ppm	38
TOC	2100
Metals	Treated
Cd	0.146
Cr	0.403
Cu	0.092
Ni	1.019
Zn	2.535

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/13/08

From: Miles Root

Lab Memo: 08-035

Subject: **Hydrochem Evaluation 0308-35**

A sample of water from Hydrochem at Entergy has been evaluated as a potential receipt for processing at CES. This sample, evaluation 0308-35, is described as ammoniated EDTA water from chemical cleaning. This source does have issues with high metals on the treated sample. The sample was treated with both our standard water treat and secondly with bleach followed by our standard treat. The bleach treating reduces all of the metals to within our discharge limits except the copper. Caution must be taken when treating with bleach, as the volume of liquid will quadruple in a second a few seconds after the bleach is added due to excessive foaming upon the rapid release of ammonia. Since this material cannot be taken to Newpark, our other option is to dilute this stream with low metals water that is received at CES Environmental. Remember to price accordingly to include costs for bleach usage.

A summary of the testing is found below.

Evaluation 0308-35			
Solids	Trace		
Phenols	<1 ppm		
pH	10		
TOC	3973		
Metals	Standard Treat	Bleach + Treat	Limits
Cd	0.216	0.137	0.20
Cr	1.241	0.715	1.00
Cu	0.461	3.412	2.00
Ni	2.27	1.680	2.00
Zn	5.70	0.151	3.00

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/11/08

From: Miles Root

Lab Memo: 08-034

Subject: **Burbank Barrel & Drum Evaluation 0308-45**

A sample of oily water from Burbank Barrel & Drum, Galena Park, has been evaluated as a potential receipt for processing at CES. This sample, evaluation 0308-45, is described as oily water sludge. While the oil can be recovered, this sample needed to be acidified and heated in order to do so. The metals on the treated water are high, and we will most likely want to send the recovered water to Newpark. This should be figured into our pricing.

This sample is an emulsion that will need to be heated and acidified in order to recover the oils. The neat sample has a pH of 12. Centrifuging this sample recovers only a trace of solids. The sample will need to be acidified to recover the oils. Acidifying this sample does produce excessive foaming, so that will need to be watched. It's best to add the acid slowly. The recovered oil is approximately 14% of the sample. The chlo-d-tect on the oil is 800 mg/L, an acceptable level. The phenolic content on the treated water is non-detected. The metals are high in nickel and zinc on the treated water. The metals results are: Cd – 0.366; Cu -0.902; Ni – 16.2; Zn – 28.1. All results are in mg/L. The very high nickel and zinc on this water will require either gross dilution with good water or opting to send this water to Newpark. This potential additional cost should be calculated into the pricing to obtain this stream.

LABCAL SERVICES

Date: March 14, 2008

Select Environmental
0308-42

CLIENT:	C E S	**Client Sample ID:**	T2008-1610H
Lab Order:		**Collection Date:**	
Project:			
Lab ID:		**Matrix:**	

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ICP METALS, TCLP LEACHED		**SW1311/6020**				Analyst: **RS**
Arsenic	ND	0.100		mg/L	1	3/14/2008
Barium	0.309	0.150		mg/L	1	3/14/2008
Cadmium	ND	0.0500		mg/L	1	3/14/2008
Chromium	ND	0.0500		mg/L	1	3/14/2008
Lead	ND	0.100		mg/L	1	3/14/2008
Mercury	0.00285	0.00100		mg/L	1	3/14/2008
Selenium	ND	0.100		mg/L	1	3/14/2008
Silver	ND	0.0500		mg/L	1	3/14/2008
METALS BY ICP-MS FOR SOLIDS		**SW6020**				Analyst: **RS**
Arsenic	0.892	0.163		mg/Kg	1	3/14/2008
Barium	119	0.174		mg/Kg	1	3/14/2008
Cadmium	1.11	0.177		mg/Kg	1	3/14/2008
Chromium	12.7	0.0950		mg/Kg	1	3/14/2008
Lead	9.98	0.323		mg/Kg	1	3/14/2008
Mercury	8.25	0.0620		mg/Kg	1	3/14/2008
Selenium	0.279	0.136		mg/Kg	1	3/14/2008
Silver	3.56	0.0670		mg/Kg	1	3/14/2008
VOLATILES TCLP		**SW8260B**				Analyst: **RS**
1,1-Dichloroethene	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
1,2-Dichloroethane	10.8	10.0		µg/L	1	3/13/2008 2:00:00 PM
2-Butanone	ND	100		µg/L	1	3/13/2008 2:00:00 PM
Benzene	359	10.0		µg/L	1	3/13/2008 2:00:00 PM
Carbon tetrachloride	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
Chlorobenzene	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
Chloroform	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
Tetrachloroethene	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
Trichloroethene	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
Vinyl chloride	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
Surr: 1,2-Dichloroethane-d4	75.4	60-140		%REC	1	3/13/2008 2:00:00 PM
Surr: 4-Bromofluorobenzene	107	80-125		%REC	1	3/13/2008 2:00:00 PM
Surr: Dibromofluoromethane	118	70-140		%REC	1	3/13/2008 2:00:00 PM
Surr: Toluene-d8	81.0	70-130		%REC	1	3/13/2008 2:00:00 PM

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Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/11/08

From: Miles Root

Lab Memo: 08-033

Subject: **Calpine, Baytown Evaluation 0308-29**

A sample of water from Calpine, Baytown has been evaluated as a potential receipt for processing at CES. This sample, evaluation 0308-29, is described as flush water. It easily treats, has a pH of 10 and a TOC of 2119. Metals are as follows: Cd – 0.178; Cu – 0.000; Ni – 0.978; Zn – 0.710. All of these data indicate that this material is totally acceptable for receipt and processing at CES.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/11/08

From: Miles Root

Lab Memo: 08-032

Subject: **Delta Chemical – Railpit Evaluation 0308-32**

A sample of oil from Delta Chemical – Railpit, has been evaluated as a potential oil source for CES. This sample appears to be a wet oil with a flash point > 140 deg F and a chlor-d-tect of 500. Solids by centrifuge show only a trace of a fine silt material. There is no separate water phase in this sample. I boiled a portion to see how it looks with less water, and it clears up nicely. It can be heated to boil off the water and then go into our base oil sales. This oil source looks good for acquisition and it should present no issues.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/10/08

From: Miles Root

Lab Memo: 08-031

Subject: **Hutchison Hayes Evaluation 0308-31**

A sample from Hutchison Hayes, Baytown, TX has been evaluated for processing at CES Environmental Services. This material, evaluation 0308-31, is process water used to clean rail cars last containing gasoline and heptane.

This water looks good for receipt. This water contains no solids and easily treats. The pH is 6, TOC is 1893 mg/L and the phenols are non-detected. The flash point is greater than 140 deg F. The generator must declare that this material will have a flash point greater than 140 deg F and that it contains no benzene.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/10/08

From: Miles Root

Lab Memo: 08-030

Subject: **PK Manufacturing Evaluation 0308-30**

A sample from PK Manufacturing, Houston, TX has been evaluated for processing at CES Environmental Services. This material, evaluation 0308-30, is process water used to cool down equipment in a metal forging shop.

This water looks good for receipt. It treats easily with no issues. The solids are less than 0.1%, the pH is 6 and it contains no visible oils or grease. The TOC is 1202, a very low value. The metals are also low. They are: Cu- 0.280; Cd – 0.154; Ni – 0.441; Zn – 0.210. Overall, this material will be easy to treat, has few impurities, and will present no handling problems.

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Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman, Marlin Moser, Bo Cumberland
Cc: Gary Peterson

Date: 03/06/08

From: Miles Root

Lab Memo: 08-029

Subject: **KMCO Butanol Testing**

The additional testing is complete for the KMCO butanol material. A sample was distilled and the pot bottoms mixed with our black oil to test for compatibility. The produced bottoms cut mixes into our black oil with no issues with a 1:1 blend. The pot bottoms were also determined to have an ash of 14.3 wt%.

The distillation temperatures required for this cut are an initial bottoms temperature of approximately 266 deg F which will climb to approximately 329 deg F. This will produce an overhead temperature of approximately 241 deg F. The recovery is approximately 60% of the charge, after which the bottoms material will begin to decompose as evidenced by the drop in the overhead temperature and the production of smoke in the pot (which will not be able to be seen in our distillation unit). Our production endpoint will need to key off the drop in overhead temperature in spite of additional heat being applied to the distillation unit.

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4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joe Wilson, Dan Bowman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/04/08

From: Miles Root

Lab Memo: 08-028

Subject: **Joe Wilson Sample Evaluations 0308-10 thru 12**

Three samples submitted by Joe Wilson have been evaluated for processing at CES. These samples have evaluation numbers 0308-10 thru 0308-12. They are Evaporator Waste Class 1, Process Die Cast Water and Oily Water. Neither of the two samples, the Evaporator Water nor Process Die Cast water contains any recoverable oil. TOC and metals were performed on the samples after performing the treatability testing. The TOC on the Evaporator water is very high at 51,550 and pricing for taking this material should take this into account.

The Oily Water sample was heated and approximately 44% oil phase separated out of the sample. The oil looked good and had a chlor-d-tect value of only 700 mg/L, which is a good low value. The water phase was tested without any treating for TOC and metals. The zinc was slightly elevated but should treat out without issues.

The table below summarizes the testing performed on these three samples. The high TOC on the Evaporator Waste should be taken into account when pricing this account. The Oily Water will have good oil recovered for future sales. The Process Die Cast water should be typical charge as it will have no abnormalities that would increase our processing costs. CES will be able to handle these materials and their acquisition should be pursued.

	Treated Samples		**Heat Only**
	Evaporator Waste	**Process Die Cast Water**	**Oily Water**
	Class 1		**(water phase)**
Sample #	**0308-10**	**0308-11**	**0308-12**
Metals			
Cd	0.000	0.000	0.000
Cu	0.000	0.000	0.047
Ni	0.791	0.594	0.553
Zn	0.404	0.137	1.521
TOC	51550	5700	5305

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/03/08

From: Miles Root

Lab Memo: 08-027

Subject: **Stolthaven Oil Sludge Evaluation 0308-02**

A sample of oil sludge from Stolthaven has been evaluated for receipt and processing at CES. This is evaluation 0308-02 and represents oil from an engine room from incoming barges. This material is mostly oil with some water and solids. The solids are approximately 5% by centrifuge, but this value is only a ballpark value due to the black appearance of this material and its solids. Water is also minimal and is less than 1% by distillation. This oil has a density of 0.953 or API of 17 and has a chlor-d-tect of only 700 mg/L. Flash point is greater than 140 deg F. We can process this oil by heating to phase separate the water and the solids will come out in the centrifuge system. We should pursue the acquisition of this material for oil recovery and sales.

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Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 03/02/08

From: Miles Root

Lab Memo: 08-026

Subject: **Arrow Recycling Evaluation 0308-01**

A sample from Arrow Recycling representing a sludge/tank bottoms sample from an oil storage tank has been evaluated for receipt and processing at CES. Material contains approximately 35% solids and 20% oil by centrifuge. Oil layer has chlor-d-tect of only 700 mg/L and is very thick. Flash point is greater than 140 deg F. This looks like material we can process at CES and I understand a receipt from this supplier is expected on Monday, March 3rd.

LABCAL SERVICES

Date: March 14, 2008

LCS

Arrow Vacuum Box

CLIENT: CES
Lab Order: 0308-41
Project:
Lab ID:

Client Sample ID: T2008-1609H
Collection Date:
Matrix:

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ICP METALS, TCLP LEACHED		**SW1311/6020**				Analyst: **RS**
Arsenic	ND	0.100		mg/L	1	3/14/2008
Barium	0.111	0.150		mg/L	1	3/14/2008
Cadmium	ND	0.0500		mg/L	1	3/14/2008
Chromium	ND	0.0500		mg/L	1	3/14/2008
Lead	ND	0.100		mg/L	1	3/14/2008
Mercury	0.00122	0.00100		mg/L	1	3/14/2008
Selenium	ND	0.100		mg/L	1	3/14/2008
Silver	ND	0.0500		mg/L	1	3/14/2008
METALS BY ICP-MS FOR SOLIDS		**SW6020**				Analyst: **RS**
Arsenic	0.325	0.163		mg/Kg	1	3/14/2008
Barium	78	0.174		mg/Kg	1	3/14/2008
Cadmium	0.98	0.177		mg/Kg	1	3/14/2008
Chromium	8.7	0.0950		mg/Kg	1	3/14/2008
Lead	6.54	0.323		mg/Kg	1	3/14/2008
Mercury	5.36	0.0620		mg/Kg	1	3/14/2008
Selenium	0.089	0.136		mg/Kg	1	3/14/2008
Silver	1.21	0.0670		mg/Kg	1	3/14/2008
VOLATILES TCLP		**SW8260B**				Analyst: **RS**
1,1-Dichloroethene	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
1,2-Dichloroethane	3.0	10.0		µg/L	1	3/13/2008 2:00:00 PM
2-Butanone	ND	100		µg/L	1	3/13/2008 2:00:00 PM
Benzene	120	10.0		µg/L	1	3/13/2008 2:00:00 PM
Carbon tetrachloride	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
Chlorobenzene	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
Chloroform	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
Tetrachloroethene	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
Trichloroethene	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
Vinyl chloride	ND	10.0		µg/L	1	3/13/2008 2:00:00 PM
Surr: 1,2-Dichloroethane-d4	75.4	60-140		%REC	1	3/13/2008 2:00:00 PM
Surr: 4-Bromofluorobenzene	107	80-125		%REC	1	3/13/2008 2:00:00 PM
Surr: Dibromofluoromethane	118	70-140		%REC	1	3/13/2008 2:00:00 PM
Surr: Toluene-d8	81.0	70-130		%REC	1	3/13/2008 2:00:00 PM

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Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

EPAHO113001979

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 02/27/08

From: Miles Root

Lab Memo: 08-025

Subject: **Schlumberger Sample Evaluation 0208-61**

A sample from Schlumberger representing a mud and additives stream has been evaluated for suitability at CES. This sample is evaluation 0208-61. This sample tests pH neutral at 7 and is very thick. It looks to have numerous small fibers that tend to bind it together. I heated a portion of this sample to over 200 deg C to see if I could better liquefy the sample, without much luck. As a non hazardous stream, this material can be brought in and placed into one of our Class 2 boxes. Its very thick consistency will require strong pumps to properly move it with the least amount of issues.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 02/22/08

From: Miles Root

Lab Memo: 08-024

Subject: **Allstate Houston Water Evaluation 0208-47**

A sample from Allstate, Houston, representing a diesel spill into water has been evaluated for suitability to process at CES. This sample is evaluation 0208-47. There is a potential to receive one or two trailers of this material. This sample looks very good with only the slightest partial sheen of diesel. The flash point is greater than 140 deg F, the TOC is a very low 710 and the sample has a pH of 6. There is not enough diesel to recover on the evaluation sample, so the actual material receipt will need to be looked at carefully to see if any recoverable diesel is present. We should be able to handle this water at a minimum charge of $.10/gallon.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Gary Lenertz, Gary Peterson, Bo Cumberland

Date: 02/19/08

From: Miles Root

Lab Memo: 08-023

Subject: **Precision Fluids Evaluations - # 0208-04 and 05**

Two samples from Precision Fluids, 1210 West Sam Houston Pkwy, have been evaluated as potential sources for CES processing. The first, 0208-04 is degreaser water used to clean metal cutting machines. The second, 0208-05, is a mix of coolant, water and oil from the same type of process. A summary of the testing is found in the table below.

	0208-04	0208-05
Solids, vol%	1.5	0.5
Chlor-d-tect		>4000
% Oil		2
TOC	1420	7050
Flash Point	>140	
pH	10	7
Metals		
Cd	0.029	0.013
Cr	0.000	0.000
Cu	0.224	3.196
Ni	0.126	0.230
Zn	0.330	3.475

As can be seen in the summary, the chlor-d-tect on the coolant/oil stream is too high for acceptance. The metals on this stream in the water phase are also high in Cu and Zn, and would need to be diluted with special handling. The water processing assumes the oil could accepted with a rebuttal provided by the supplier to account for the high chlorides. The degreaser water sample is good for us to receive and will process with no issues. Of the two samples, only evaluation 0208-04, the degreaser water, currently meets the requirements for our processing.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Bo Cumberland

Date: 02/15/08

From: Miles Root

Lab Memo: 08-022

Subject: **Tesco Industries Used Oil Evaluation - # 0208-33**

A sample of oil and water from Tesco Industries, Bellville, has been evaluated as a source to use in our black oil. This material is used oil from equipment fluid changes. The sample is close to being a 50/50 mix of oil and water. The oil has a chlor-d-tect value less than 500 mg/L and a flash point greater than 140 deg F. The oil blends easily with black oil and will be a good fit. This source will be a few drums of material.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman, Matt Bowman
Cc: Gary Lenertz, Bo Cumberland

Date: 02/14/08

From: Miles Root

Lab Memo: 08-021

Subject: **TEPPCO, Texas City Solids Evaluation - # 0208-29**

A sample of solids from TEPPCO, Texas City, has been evaluated to find a solvent that will help to remove this material from a tank that is being cleaned. Attempts to identify a suitable solvent that we have on hand have not been successful.

Tested on two trials were diesel and then black oil. The solids seem to be partially soluble in both diesel and black oil. In each case, the solutions were heated to approximately 220 deg F and the solids mixed in the solution. Considerable foaming occurs when they are mixed (probably from boiling out any lights) and in each case much, but not all of the solids are "dissolved" in the solution. When allowed to cool to room temperature, the solids settle out and form waxy sediments on the bottom of the test beaker.

A percent solids run on the liquid portion after the sample is allowed to cool shows around 5%, but it is difficult to measure accurately. The solvents are obviously dissolving some of the solids into solution, but I would estimate that the majority of them return once the solutions are allowed to cool.

A good guess for these solids would be that they consist largely of paraffin wax. The material looks and feels like wax. I don't see any signs that we are dealing with rust, dirt or other non crude oil type of issues with this material. The fact that much of it comes back as a smooth layer on the bottom of the test beaker as the solution cools is another indicator of a paraffin. The temperature at which this occurs is known as the wax appearance temperature, or WAT, in the crude oil industry, and will vary depending upon the slate of crude being processed. These tank bottom solids have probably just built up over time. Unfortunately, our black oil will not totally solubilize this material, even at rather elevated temperatures.

I am open to any other suggestions. Internet research shows this to be a fairly common issue, with manual cleaning many times the only resolution.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Bo Cumberland

Date: 02/14/08

From: Miles Root

Lab Memo: 08-020

Subject: **Ethyl Pasadena Fuel Additives Evaluations - # 0208-30 thru 32**

Three samples of fuel additives from Ethyl, Pasadena have been evaluated as potential blend stock for our light ends, base oil or black oil. The three samples for evaluation are out of specification fuel additives. The first, 0208-30, HiTEC 4103 Cetane Improver, has a very low viscosity and light color. It mixes readily with light ends, base oil or black oil. The second, 0208-31, OR-LED3/OR-LED3 (bio), is a viscous dark brown liquid which also readily mixes with light ends, base oil or black oil. The third, 0208-32, Santoquin Liquid, is light brown in color, fairly viscous, and readily mixes with light ends, base oil or black oil. This sample was 90% aqueous, and if representative of the actual material we will be receiving, should be charged accordingly.

All three of these streams can be mixed with our oil products. They blend easily and without issues with light ends, base oil or black oil. My understanding is that these products will be arriving in drums and/or totes. This will make their processing more difficult and time consuming. Be sure to charge accordingly.

Santoquin
CES 0208-32

NOVUS
Novus International, Inc.
530 Maryville Centre Drive
St. Louis, MO 63141
314-576-8886
www.novusint.com

PRODUCT SPECIFICATION

PRODUCT: Santoquin® Liquid
Feed and Forage Antioxidant

EFFECTIVE: February 2, 2004

CHARACTERISTICS	LIMITS
Appearance	Yellow to red to brown liquid
Titration Assay, % ethoxyquin	81.0 Minimum
Phenetidine, weight %	3.0 Maximum
...-elated materials, weight %	6.0 Maximum
Lead, mg/kg	2 Maximum
Production Location:	Various
Packaging:	200 kg drum; 204.1 Kg drum; 1000 kg IBC; tank truck

For order assistance, please call Novus International, Inc.
Customer Service Department Toll Free: 1-800-568-0088

NON-HAZ
Need sample

1-Tote

~~May 1-314-789-6242~~

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MSDS No. 80001 .1
Date: March 1 9, 2005
Page 1 of 8

MATERIAL SAFETY DATA SHEET

1. PRODUCT IDENTIFICATION

Synonyms: 1,2-Dihydro-6-Ethoxy-2,2,4-Trimethylquinoline
Chemical Formula: $C_{14}H_{19}NO$
CAS Reg. No.: 91-53-2
Product Use: Feed and Forage Antioxidant

NOVUS INTERNATIONAL, INC.
530 Maryville Centre Drive
St. Louis, MO 63141-5843
Telephone: 314-576-8886
For Emergencies: 800-568-0088
CHEMTREC: 800-424-9300

NOVUS INT'L (CANADA) INC.
1910 South Sheridan Way
Oakville, ON, CAN L6J 7S8
Telephone: 905-845-4878
CANUTEC: 613-996-6666

NOVUS Internacional de Mexico
Bosque de Ciruelos, 194 P.M
Col. Bosques de las Lomas
Mexico, D.F. 11700
Telephone: 525-251-3433
SETIQ (in Mexico): 91-800-002-1400

2. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Ingredients:	CAS Number	% by weight	OSHA PEL	ACGIH TLV
Ethoxyquin (1,2-dihydro-6-ethoxy-2,2,4-trimethylquinoline)	91-53-2	91 - 100	N.E.	N.E.
Paraphenetidine (p-ethoxyaniline)	156-43-4	0 - 3	N.E.	N.E.

N.E. = Not Established

3. HAZARDS IDENTIFICATION

Emergency Overview

WARNING: **MAY BE HARMFUL IF SWALLOWED. CAUSES IRRITATION TO SKIN AND EYES MAY CAUSE ALLERGIC SKIN REACTION.**

Potential Health Effects

EYE CONTACT: Causes irritation, redness and pain.

SKIN CONTACT: Causes irritation to skin. Symptoms include redness, itching and pain. May produce skin sensitization or allergic skin reaction.

INHALATION: No information

INGESTION: May cause irritation to gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea.

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MATERIAL SAFETY DATA SHEET
Santoquin® Liquid

4. FIRST AID PROCEDURES

IF IN EYES: Immediately flush with plenty of water for at least 15 minutes. Remove contact lenses when possible. If irritation persists, get medical attention.

IF ON SKIN: Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. If irritation persists, get medical attention. Wash clothing before reuse.

IF INHALED: Immediate first aid not likely to be required. If symptoms occur, remove to fresh air.

IF SWALLOWED: Wash out mouth with water, provided person is conscious. Get medical attention. If large quantities of this product are swallowed, call a physician. Do NOT induce vomiting unless directed to do so by a physician. Never give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

FLASH POINT:	107°C (224°F)	Closed Cup
	140 - 143°C (284-289°F)	Cleveland Open Cup

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or appropriate foam

SPECIAL INSTRUCTIONS: As in any fire, wear self-contained breathing apparatus (pressure-demand, MSHA/NIOSH approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

SPILLS: Wear appropriate personal protective equipment as specified in section 8. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (vermiculite, dry sand, earth), and place in a chemical waste container. Do not flush to sewer. Dispose in accordance with federal, state, and local procedures.

7. HANDLING AND STORAGE

Keep in a tightly closed container, stored in a cool, dry ventilated area. Recommended temperature = 10-50° C (50-122°F). Protect against physical damage. Product causes staining. Store away from materials where staining would be a concern.

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MATERIAL SAFETY DATA SHEET
Santoquin® Liquid

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EYE PROTECTION:	Wear appropriate chemical safety glasses or goggles as described by OSHA's eye and face regulation in 29 CFR 1910.133. Facilities storing or using product should be equipped with an eye wash facility.
SKIN PROTECTION:	Wear appropriate protective clothing and chemical-resistant gloves to prevent skin contact. Wash thoroughly after handling product.
PERSONAL RESPIRATORY:	Avoid breathing vapor. Use MSHA/NIOSH-approved respiratory protection equipment when airborne exposure limits are exceeded (see Section 2, Exposure Limits). Respiratory protection programs must be in compliance with 29 CFR 1910.134.
VENTILATION:	Good general ventilation should be sufficient to control airborne levels. If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult NFPA Standard 91 for design of exhaust systems.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Yellow to red to brown liquid.	Odor:	Sweet odor.
Solubility in Water:	75 mg/l @ 25°C (77°F).	pH:	Not available.
Boiling Point:	123 – 125 °C @ 2 mm Hg.	Vapor Pressure:	1.92x10-4 mm @ 0°C (32 °F) 2.58x10-4 mm @ 25°C (77 °F)
Vapor Density:	Not available.		
Evaporation Rate:	Not available.	Specific Gravity:	1.029 @ 25°C (77 °F)

10. STABILITY AND REACTIVITY

STABILITY:	Stable under expected and reasonable conditions of storage and use.
INCOMPATIBILITIES:	Strong acids, oxidizing materials and high temperatures.
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS:	Carbon dioxide carbon monoxide and nitrogen oxides can be produced.
HAZARDOUS POLYMERIZATION:	Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Data:

Oral rat LD50: 2,040 mg/kg
Dermal rabbit LD50: >3,180 mg/kg
Eye irritation: Slightly irritating to eyes (rabbit)
Skin irritation: Slightly irritating to skin (rabbit), 24 hrs.
No genetic effects observed in standard tests using bacterial cells and whole animals
Repeated dose oral administration caused kidney and liver effects Only at very high dose levels
Developmental toxicity: No birth defects noted (rat-oral)
Reproductive toxicity: No effect on fertility or reproduction noted in rat and rabbit studies

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MATERIAL SAFETY DATA SHEET
Santoquin® Liquid

Carcinogenicity: Ethoxyquin is not listed as a carcinogen.

12. ECOLOGICAL INFORMATION

Fish toxicity: 96hr. LC50 (Fathead Minnow) 7.1 mg/L
Invertebrate toxicity: 48hr. EC50 (Daphnia Magna) 2.2 mg/L

13. DISPOSAL CONSIDERATIONS

Dispose of all empty containers, contaminated products, debris, sorbents and other spill clean-up materials in accordance with applicable Federal, state or local procedures. Do not reuse containers.

14. TRANSPORTATION INFORMATION

U.S. DOT - Not regulated
Canada TDG - Not regulated

15. REGULATORY INFORMATION

SARA Hazard Notification: Physical & Health Hazard Categories, 40 CFR Part 370:
√ Immediate (acute): Effects occur rapidly and are of short duration.
√ Delayed (chronic):
_ Fire hazard:
_ Reactive hazard:
_ Sudden Release of Pressure

Section 313 Toxic Chemical(s):	Not applicable	
Section 302 Extremely Hazardous Substances:	Not applicable	
OSHA Hazard Communication Standard:	Hazardous under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200).	
NFPA Hazard Identification Label:	Health-1; Fire Hazard-1; Reactivity-0; Specific Hazard-None	
HMIS® Rating:	Health-2; Flammability-1; Reactivity-0; PPI-B	
WHMIS Classification:	D2(B) This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation. This MSDS contains all the information required by the Canadian Controlled Products Regulation.	
European Information:	Xn	Harmful
	R22	Harmful if swallowed
	R43	May cause sensitization by skin contact.
	S24	Avoid contact with the skin
	S35	This material and its container must be disposed of in a safe way.
	S37	Wear suitable gloves.

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MATERIAL SAFETY DATA SHEET
Santoquin® Liquid

Miscellaneous Information:

FDA Citations:
ethoxyquin (91-53-2) 21CFR172.140, 21CFR573.380, 21CFR573.400

16. OTHER INFORMATION

Label Text: WARNING: MAY BE HARMFUL IF SWALLOWED. CAUSES IRRITATION TO SKIN AND EYES. MAY CAUSE ALLERGIC SKIN REACTION.

Avoid contact with eyes, skin and clothing
Do not taste or swallow
Wash thoroughly after handling

Prepared By: Stephanie J Geiselmann
Title: Manager, Government Affairs

Supercedes MSDS Number: SC001.?, issue date January 1, 2004

Revision Information: Section 15

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

GOVERNMENT AFFAIRS
NOVUS INTERNATIONAL, INC. TELEPHONE: 314-576-8421 FAX: 314-576-2148

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LED 3 0208-31

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ORYXE ENERGY INTERNATIONAL, INC.

Material Safety Data Sheet

Section 1 – Product and Company Information

Product Name	OR-LED3 / OR-LED3 (bio)
Application	Combustion improver for no. 2 diesel fuels and biodiesel blends up to B-20.
Appearance	Opaque red-brick brown liquid
Chemical Family	Mixture of aromatic solvents and proprietary organic chemicals
Company	ORYXE Energy International, Inc.
Contact Address	9805 Research Drive Irvine, California 92618 USA
Telephone	(949) 748 – 8800 (Office hours PST - non emergency information) **CHEM-TEL - 24 hour emergency service** (800) 255 – 3924 (Domestic – USA) +1 (813) 248 – 0585 (International)

Section 2 – Composition and Information on Ingredients

Composition	Organic nitrate, aromatic solvent, organic compound and synthetic compound.
Ingredients	2-Ethylhexyl Nitrate, conc. (%w/w) 45 – 55%, CAS No. 27247-96-7 Toluene, conc. (%w/w) 45 – 55%, CAS No. 108-88-3

Section 3 – Hazards Identification

Primary Hazards	Flammable liquid, can release vapors that form flammable mixtures at temperatures at or above the flashpoint temperature. Vapor can cause flash fire. Keep away from heat, sparks, flames, static electricity or other sources of ignition. When heated above 100°C / 212°F may undergo a self-accelerating, exothermic reaction which causes a rapid rise in temperature and pressure. Rupture of storage vessels and fire should be anticipated in case of such temperature. Harmful if inhaled, swallowed or absorbed through skin. **INHALATION INTO THE RESPIRATORY SYSTEM MAY CAUSE SERIOUS ADVERSE HEALTH EFFECTS.** Skin and eye irritant. Chronic toxicity hazard. See appropriate sections for detailed description of hazards.

Flammable Liq
marine pollutant
mixed w/ Cetane Improver

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Material Safety Data Sheet

Section 4 – First Aid Measures

Eye Contact	Flush eyes immediately with large amounts of water for at least 15 minutes until irritation, if any, subsides. Get prompt medical attention.
Skin Contact	Flush with large amounts of water for at least 15 minutes. Remove contaminated clothing and shoes and wash thoroughly before reuse. Get prompt medical attention.
Inhalation	Using appropriate respiratory equipment, immediately move a person affected by inhaled vapors to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get prompt medical attention.
Ingestion	If swallowed, **DO NOT INDUCE VOMITING.** Vomiting may cause aspiration pneumonia or other adverse health effects Keep person at rest. If conscious, give one to two glasses of water to drink. Never give anything by mouth to an unconscious person. Get prompt medical attention.

Section 5 – Fire Fighting Measures

Flammability	**FLAMMABLE LIQUID.** The vapors form flammable mixtures with air at temperatures at or above the flashpoint temperature. This liquid is volatile and gives off invisible vapors that may settle in low areas and can persist in confined spaces. The vapors may travel some distance along the ground or surface before reaching an ignition source that can cause the vapors to ignite or explode. Flash Point (PMCC): 18.3°C (65°F) Flammable Limits (vapor, in air, by volume): Lower 1.4%, Upper 7.4%. Approximate auto-ignition temperature: 425°C (800°F) (for Toluene vapors above the liquid) **REACTIVE LIQUID.** When heated above 100°C / 212°F may undergo a self-accelerating, exothermic reaction, which causes a rapid rise in temperature and pressure. Rupture of storage vessels and fire should be anticipated in case of such temperature.
Extinguishing Media	In case of fire, use water spray (fog), foam, dry chemicals or CO2 to control / extinguish fire. In **FIRE SITUATION**, use water deluge or spray to cool containers and maintain vessel temperature below the 100°C / 212°F temperature at which the contained material can undergo self accelerating exothermic reaction.
Decomposition Products	**WARNING: HAZARDOUS FUMES.** Smoke and fumes may contain carbon monoxide and nitrous oxide. Trained fire fighting personnel must wear proper protective clothing and breathing equipment.

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Material Safety Data Sheet

Section 6 – Accidental Release Measures

Spill Response	Immediately eliminate all potential sources of ignition. Contact emergency personnel. Prevent spilled liquid from entering sewers, drains, watercourses or low areas. Contain with sand, earth or other non-flammable absorbents. Do not use sawdust. Avoid contact with spilled material. Wear proper protective equipment when dealing with a spill. For spills on water, immediately warn shipping and other activities in downstream areas. Contain spill using floating booms. Recover with suitable absorbent. All other precautionary measures outlined above for land spills also apply. OR-LED3 / OR-LED3 (bio) is a marine pollutant.
Clean Up and Disposal	Spilled liquid can be recovered by pumping or absorbents. Use only hand pumps or pumps with explosion proof motors. Dispose of recovered material in compliance with local regulations. Consult a spill response expert or local authorities if necessary. Federal, state, local laws and regulations may apply to release and disposal of OR-LED3 / OR-LED3 (bio). Spills larger than 1,000 lbs (450 kg) must be reported to the National Response Center (see Section 15).
Environmental Impact	Soil and groundwater sampling and monitoring may be necessary in areas where leakage of this product into the soil may have gone undetected for some length of time. Consult an expert on proper remediation.

Section 7 – Handling and Storage

Storage	Keep containers tightly closed and sealed until ready for use. Keep containers in cool, well ventilated space; avoid storage in direct sunlight. Keep away from heat, sparks, flame or other sources of ignition; use only with adequate ventilation. Minimize exposure to air. Take appropriate precautions to prevent the formation of flammable air/hydrocarbon conditions in tank and/or storage container void spaces. See flammability limits in Section 5. Store on paved or otherwise impervious surface to provide secondary containment; provide drainage to a sump, which is only opened under supervision.
Handling	Handle with care. Avoid breathing of this material or contact with skin, eyes and clothing. Provide all necessary training for personnel involved in handling this hazardous material, such as forklift operation, drum handling, the use of personal protective equipment, fire fighting, spill response and hazard communication. Empty containers may contain liquid or vapor residue that can ignite

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Material Safety Data Sheet

	and explode. **DO NOT EXPOSE SUCH CONTAINERS TO HEAT, FLAMES, SPARKS, STATIC ELCTRICITY OR OTHER SOURCES OF IGNITION – THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.**
	Empty containers such as drums and totes must be completely drained, closed off and properly recycled, cleaned or disposed of in accordance with regulations.
Electrostatic Hazard	Liquid and vapors can accumulate an electrostatic charge which can lead to ignition, fire and explosion. Keep containers grounded at all times when transferring product.

Section 8 – Exposure Control and Personal Protection

Engineering Controls	Provide exhaust ventilation to keep airborne concentrations of vapors below maximum allowable concentrations. Provide local vapor exhaust suction. Laboratory samples must be handled under a lab hood. Use explosion proof ventilation equipment. Locate exhaust in safe location.
Workplace Exposure	The permissible exposure limits under OSHA 29 CFR 1910.1000 for the solvent toluene are a TWA PEL of 100 ppm (375 mg/m3) and a STEL of 150 ppm (560 mg/m3). The ACGIH recommends a TWA threshold limit value of 50 ppm (188 mg/m3) for toluene.
	The recommended occupational exposure limit for one of the active ingredients is a TWA of 1 ppm. Since the solvent may assist the normally less volatile active ingredient to become airborne, it is recommended that a TWA of 5 ppm (19 mg/m3) for toluene be maintained. At this level of solvent concentration in air, concentrations of all active ingredients are expected to be below their respective threshold values.
Protective Equipment	Respiratory System: Where concentrations in air may exceed the limits given in this Section 8 or otherwise present a respiratory hazard, for instance when making or breaking lines/connections or taking samples, use NIOSH approved respirators for organic chemicals.
	Eye Protection: Wear safety glasses with side shields as a minimum. For operations such as sampling, draining and flange breaks, where exposure is likely, a full face shield is recommended.
	Hand Protection: Wear chemical resistant, impervious gloves.
	Skin and Body Protection: Where contact is likely, such as in spill response and maintenance work, wear chemical resistant gloves, a chemical resistant suit, and chemical resistant boots.

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Material Safety Data Sheet

Section 9 – Physical and Chemical Properties

General Properties	Opaque red-brick brown liquid with aromatic odor
Specific Gravity (Liquid)	0.9182 to 0.9210 at 16 °C (60 °F)
Vapor Pressure	0.097 psi-absolute at 5 °C (40 °F) 0.180 psi-absolute at 16 °C (60 °F) 0.317 psi-absolute at 27 °C (80 °F) 0.538 psi-absolute at 38 °C (100 °F)
Viscosity	0.9696 cSt at 20 °C (68 °F)
Water Solubility	0.052 wt. % at 22 °C (72 °F)
Flash Point (PMCC)	18.3 °C (65 °F)
Initial Boiling Point	111 °C (232 °F)
Final Boiling Point	Cannot be specified because thermal decomposition occurs before final boiling point

Section 10 – Stability and Reactivity

Stability	This material can become unstable at temperatures greater than 100°C (212°F). Prolonged exposure to sunlight can lead to polymerization and degradation of some of the active ingredients.
Materials to Avoid	Strong oxidizing and reducing agents, concentrated nitric or sulfuric acid, halogens, or molten sulfur.
Conditions to Avoid	Flammable mixture with air; Temperatures above 60°C (140°F); Ignition sources (sparks, flames, electric discharges, etc).

Section 11 – Toxicological Information

Routes of Entry	Inhalation, ingestion or absorbed through the skin.
Acute Effects	Harmful if inhaled, swallowed or in contact with skin. Frequent or prolonged contact with the skin may cause dermatitis. Occasional brief contact with the liquid will not result in significant irritation unless evaporation is impeded. Skin contact may aggravate an existing dermatitis condition. Organs at risk include the cardiovascular system. High vapor/aerosol concentrations (greater than approximately 1,000 ppm) are irritating to the eyes and the respiratory tract. Small amounts of this product

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Material Safety Data Sheet

	aspirated into the respiratory system can cause mild to severe pulmonary injury and possible death.
Chronic Effects	Overexposure to organic nitrates through inhalation or skin contact can cause headache, nausea, dizziness, anesthesia, drowsiness, unconsciousness, and/or decreased blood pressure. Overexposure through concentrated, prolonged or deliberate inhalation of toluene may cause damage to the brain and the nervous system, leading to possible death.
Carcinogenic Effects	None of the components of this product are currently listed as a carcinogen by IARC, NTP, OSHA, EU, or ACGIH.
Reproduction Effects	Prolonged and repeated exposure of pregnant animals to toluene at levels of 1,500 ppm and greater has been reported to cause adverse fetal developmental effects.

Section 12 – Ecological Effects

Environmental Hazards	Environmentally hazardous substance. Please refer to Section 6 for spill response.
Environmental Fate	This product contains components which may be persistent in the environment.

Section 13 – Disposal Considerations

Product Waste	Product can be disposed of by combustion. Do not allow material to drain into sewers or water supplies. All waste must be disposed of in accordance with federal, state and local environmental regulations.
Packaging	Empty containers may contain flammable vapors and explosive vapor/air mixtures. See Section 5 for additional guidelines.

Section 14 – Transportation Information

DOT Classification	UN 1993, Flammable Liquid, n.o.s., 3, PG II, Marine Pollutant (Toluene, 2-Ethylhexyl Nitrate)
Description	2-Ethylhexyl Nitrate, conc. (%w/w) 45-55%, CAS No. 27247-96-7 + Toluene, conc. (%w/w) 45-55%, CAS No. 108-88-3

Section 15 – Regulatory Information

TSCA	TSCA Inventory Listing UVBC (Unknown, Variable or Biological Chemical)
CERCLA	Toluene is a RCRA listed hazardous waste (Code U220). Reportable spill quantity 1,000 lbs (453 kg). Any spill involving more than this quantity must be reported immediately to the National Response Center by calling (800) 424 – 8802.

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Material Safety Data Sheet

SARA Title III	SARA 311/312 Classification(s): Immediate Health, Delayed Health, Fire, Reactive. SARA 313: 1% de minimis. This information may be subject to the provisions of the Community Right-to-Know stipulations.
Other	California Prop. 65 reporting required. Community Right-to-Know stipulations apply.

Section 16 – Other Information

Application	This product is prepared solely for the use in no. 2 diesel fuel to enhance engine performance and reduce harmful exhaust emissions.
Caution	This information relates to the specific product described herein, and may not be valid or complete for such product when used in combination with other materials or in processes for which it was not intended. The information contained herein is compiled to the best of ORYXE Energy's knowledge and is believed to be accurate and reliable as of the date of issue. However, no representation, warranty or guarantee is made as to its accuracy or of any other nature with respect to the product to which this information refers. It is the user's responsibility to verify the suitability and completeness of such information for the user's particular circumstances and in accordance applicable federal, state and local laws and regulations. ORYXE Energy does not accept any liability for loss or damage that may occur from the use of this information nor does ORYXE Energy offer any warranty against patent infringement.
Hazard Rating System	Hazardous Material Information System (U.S.A.):

	2-Ethylhexyl Nitrate	Toluene	OR-LED3/OR-LED3 (bio)
Health	2	2	2
Flammability	2	3	3
Reactivity	1	0	1

Date Created	August 10, 2006
Date Revised	July 17, 2007
Content(s) Revised	Sections 1
MSDS Number	MSDS.ORLED3.071707.002-006

Hitec 4103
0208-30

Afton CHEMICAL

Material Safety Data Sheet

HiTEC 4103 Cetane Improver

MSDS no. H4103

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use	Petrochemical Industry: Diesel Fuel Additive
Synonyms	Diesel Ignition Improver 3 (DII-3).
Date of issue/Revisions	**23 July 2007**

In case of emergency - Chemical

1-800-403-0044 (US & Canada)
1-604-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141
msds@aftonchemical.com

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 3 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 2 and 15 for country specific classification information, and Section 11 for additional details.

The preparation is classified as dangerous according to Directive 1999/45/EC and its amendments.
Classified as hazardous according to the criteria of NOHSC and classified as dangerous goods according to the ADG Code.

Primary hazards and critical effects	: WARNING! HARMFUL IF ABSORBED THROUGH SKIN OR IF INHALED. ASPIRATION HAZARD IF SWALLOWED.
Physical/chemical hazards	: COMBUSTIBLE. - United States and Canada VAPOR MAY CAUSE FLASH FIRE. When heated above 100°C/212°F may undergo a self-accelerating, exothermic reaction which causes a rapid rise in temperature and pressure. Rupture of storage vessels and fire should be anticipated in case of such temperature.
Environmental hazards	: Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	[illegible]
[illegible]	[illegible]
Reactivity	1

Combustible Liq
mixed w/ LEN 3
[illegible] 1705 self

EPAHO113001999

3. Composition and information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information.

Substance/Preparation : Preparation

Ingredient name	CAS no.	Conc. (% w/w)	EU Classification	WHMIS Regulated?
2-Ethylhexyl nitrate	27247-96-7	>99	R44 Xn; R20/21	Yes.

4. First aid measures

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion : DO NOT induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get immediate medical attention.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

Extinguishing media : In case of fire, use water spray (fog), foam, dry chemical, or CO2.

Fire-fighting procedures : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
When heated above 100°C/212°F may undergo a self-accelerating, exothermic reaction which causes a rapid rise in temperature and pressure. Rupture of storage vessels and fire should be anticipated in case of such temperature. Spray storage vessels with water to maintain temperature below 100°C/212°F.

Fire/explosion hazards : COMBUSTIBLE. - United States and Canada
VAPOR MAY CAUSE FLASH FIRE. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Hazardous decomposition products : These products are carbon oxides (CO, CO_2), nitrogen oxides (NO, NO_2 etc.).

Flash point : Closed cup: 65°C (149°F). (Pensky-Martens. Minimum)

6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5). Do not touch or walk through spilled material.

Environmental precautions and clean-up methods : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Avoid prolonged contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling.

Storage : Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

8. Exposure controls and personal protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal protective equipment

Respiratory system : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s). (Approved/certified respirator with organic vapor cartridge.)

Skin and body : Where contact is likely, wear chemical resistant gloves, a chemical resistant suit, and boots. Additional body garments should be used based upon the task being performed.

Hands : Use chemical resistant, impervious gloves.

Eyes : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

Ingredient name	OEL United States	OEL Canada	OEL Europe	OEL Australia
1) 2-Ethylhexyl nitrate	**Afton (United States).** TWA: 1 ppm 8 hour/hours.	**Afton (Canada).** TWA: 1 ppm 8 hour/hours.	**Afton (Europe).** TWA: 1 ppm 8 hour/hours.	**Afton (Australia).** TWA: 1 ppm 8 hour/hours.

9. Physical and chemical properties

Physical state and Appearance : Liquid.

Color : Colorless to light yellow.

Odor : Fruity. Pungent. Ester. Characteristic.

Vapor pressure : 0.2 mmHg at 20°C.

Density : 0.962 g/cm³ at 20°C

Specific gravity : 0.96 at 20°C

Solubility : 12.6 mg/L @ 20°C (Solubility in water)

Viscosity : 1.8 cSt at 20°C (typical).

Auto-ignition temperature : 130 °C

Flash point : Closed cup: 65°C (149°F). (Pensky-Martens. Minimum)

10. Stability and reactivity

Stability : Unstable at temperatures greater than 100°C/212°F.

Materials to avoid : Strong oxidizing and reducing agents.

Conditions to avoid : High temperatures, sparks, and open flames.

Temperatures above 50°C/122°F-60°C/140°F, sparks, and open flames.

11. Toxicological information

Routes of entry : Skin. Eyes. Ingestion, and Inhalation.

Target organs : Contains material which may cause damage to the following organs: cardiovascular system.

Acute effects

Inhalation : Harmful by inhalation.

Overexposure to organic nitrates by inhalation of vapor or skin contact may cause headache, dizziness, nausea, and decreased blood pressure.

Ingestion : Aspiration hazard if swallowed. Can enter lungs and cause damage. Does not meet EU R65 classification criteria.

Skin contact : Harmful in contact with skin.

Overexposure to organic nitrates by inhalation of vapor or skin contact may cause headache, dizziness, nausea, and decreased blood pressure.

Eye contact : Non-irritating to the eyes.

Adverse effects : - Adverse symptoms may include: Overexposure to organic nitrates by inhalation of vapor or skin contact may cause headache, dizziness, nausea, and decreased blood pressure.

Carcinogenic effects : Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity data

Ingredient name	Test	Result	Route	Species
HiTEC 4103 Cetane Improver	LD50	>10000 mg/kg	Oral	Rat
	LD50	>5000 mg/kg	Dermal	Rabbit

12. Ecological information

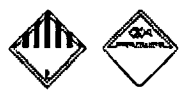
Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.

Environmental fate : This product contains components which may be persistent in the environment.

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	NA1993	Combustible liquids, n.o.s. (2-ethylhexyl nitrate).. Marine pollutant	Combustible liquid.	III		**Marine pollutant** Marine pollutant (P) **Remarks** Marine pollutant
TDG Classification	UN3082	Environmentally hazardous substance, liquid, n.o.s. (2-ethylhexyl nitrate). Marine pollutant	9	III		Not available.
ADR/RID Class	UN3082	Environmentally hazardous substance, liquid, n.o.s. (2-ethylhexyl nitrate)	9	III		**Hazard identification number** 90
IMDG Class	UN3082	Environmentally hazardous substance, liquid, n.o.s. (2-ethylhexyl nitrate). Marine pollutant	9	III		**Marine pollutant** Marine pollutant (P)
IATA-DGR Class	UN3082	Environmentally hazardous substance, liquid, n.o.s. (2-ethylhexyl nitrate)	9	III		-
ADG Class	UN3082	Environmentally hazardous substance, liquid, n.o.s. (2-ethylhexyl nitrate)	9	III		-

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information

EU regulations

Hazard symbol(s) :

Harmful

Risk phrases : R44- Risk of explosion if heated under confinement.
R20/21- Harmful by inhalation and in contact with skin.

Safety phrases : S15- Keep away from heat.
S23- Do not breathe vapor.
S24/25- Avoid contact with skin and eyes.
S36/37/39- Wear suitable protective clothing, gloves and eye/face protection.

Contains : 2-Ethylhexyl nitrate

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : SARA 311/312 MSDS distribution - chemical inventory - hazard identification: : Fire hazard,reactive, Immediate (acute) health hazard

RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class F: Dangerously reactive material.

International Inventory Status

United States	: All components on TSCA Inventory
Canada	: All components on DSL
Europe	: All components on EINECS
Japan	: All components on METI
Australia	: All components on NICNAS
Korea	: All components on ECL
China	: All components on IECSC
Philippines	: All components on PICCS

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 7/23/2007.

Date of printing : **7/30/2007.**

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

ADDRESS CONTACT INFORMATION

In the United States and Canada:
Afton Chemical Corporation
500 Spring Street
Richmond, Virginia
USA 23219-2183
Telephone number: 804-788-5800

In Singapore:
111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

In Europe:
Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg.
5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

*** END OF MSDS ***

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Gary Lenertz

Date: 02/11/08

From: Miles Root

Lab Memo: 08-019

Subject: **IESI Hardin County Landfill Evaluation 0208-21**

A sample of water from IESI Hardin County Landfill, Kountzee, evaluation 0208-21, has been evaluated as a potential source of business for water processing. Two samples were brought in and an equal volume composite was made for testing. Overall, this sample looks very good and should be pursued as an acquisition.

This sample easily treats with no issues. The samples do have a very slight odor, but nothing offensive. The analytical test results are below.

pH = 6
TOC = 988 mg/L
Solids < 0.1%
Metals, ppm
Cr = 0.067
Cu = 0.00
Ni = 0.00
Zn = 0.212

This will be a good business to pursue.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Gary Lenertz

Date: 02/07/08

From: Miles Root

Lab Memo: 08-018

Subject: **Ball Container Corp Evaluation 0802-13**

A sample of oil from Ball Container Corp, Conroe, TX has been evaluated as a potential oil source for CES business. This sample represents oils used in the production of aluminum cans and may contain lube oils, hydraulic oils and water soluble lubricants.

This sample does contain a small percentage of solids consisting of probably aluminum fines and grit from the processing. The vast majority of this sample is good oil. The test results are below:

BTU – 18,130
Water, volume% - 1.5
Flash Point - >140 deg F
Ash, wt% - 0.0
Chlor-d-tect - <500 mg/L

The bottom phase solids can be handled with our filter press, and they are small in volume. The sample when boiled to remove the water is dark amber in appearance and has an odor not typical of our base oils.

This will be a good account to pursue.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dana Carter
Cc: Gary Lenertz

Date: 02/04/08

From: Miles Root

Lab Memo: 08-017

Subject: **Hydrochem Evaluation 0208-02**

A sample from Hydrochem at Targa has been evaluated as a potential waste water stream for processing. This water is water from the chemical cleaning of a boiler prior to use. This water is easily treated, has a pH of 9 and a TOC of 1214 mg/L. Metals were also run on this sample and are low. Test results for the metals, in ppm are:

Cd = 0.05
Cu = 0.09
Cr = 0.0
Ni = 0.01
Zn = 0.5

All of these values are well within our discharge limits. Overall, this water looks good for processing and should present no issues.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz

Date: 02/01/08

From: Miles Root

Lab Memo: 08-016

Subject: **OEM Production Waste Evaluation 0108-83**

A sample from OEM production waste has been evaluated as a potential recycle to be put into black oil. This stream is d-limonene which has been used to degrease pipe. Overall, this material looks good to bring in and mix with our black oil. It blends in well with the oil with no issues. Water is 1.6%, flash point is greater than 140 deg F and the chlor-d-tect is less than 400 mg/L.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Joy Baker
Cc: Gary Lenertz

Date: 01/30/08

From: Miles Root

Lab Memo: 08-015

Subject: **Phoenix Sample Evaluations 0108-68 and 69**

Two samples from Phoenix have been evaluated for potential processing at CES. The test results are summarized in the table below. Overall, these streams are good for processing and we should have no issues. Sample 0108-69 does have solids at 4% that will settle to the bottom of the container, leaving essentially clear water. Both samples treat easily with no issues.

Test Measurement	0108-68 Intra	0108-69 Rain for Rent
pH	6	6
TOC, mg/L	950	315
Solids, vol%	<0.5	4
Flash Point, deg F	>140	>140
Phenols, mg/L	0	0
Metals, mg/L		
Cd	0.057	0.04
Cr	0.192	0
Cu	0	0
Ni	1.748	0.43
Zn	0.447	0.363

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman

Date: 01/30/08

From: Miles Root

Lab Memo: 08-014

Subject: **Houston Intenational Terminals Evaluation 0108-73**

A sample of used oily wastewater and sludge from Houston International Terminals on I-10, sample evaluation 0108-73, has been tested with the following results:

Oil by centrifuge – 44%
Water by centrifuge – 45%
Solids by centrifuge – 11%
Flash Point (oil phase) - 100-110 deg F
Chlor-d-tect (oil phase) >4000 mg/L

Material mixes well with black oil in a ratio of 1:2 (sample:black oil).

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Lenertz

Date: 01/28/08

From: Miles Root

Lab Memo: 08-013

Subject: **Arkema Sulfidic Caustic Evaluation 0108-58**

A sample of Arkema spent sulfidic caustic, evaluation 0108-58 has been tested with the following results:

Specific Gravity – 1.102 @ 15.5 deg C
Caustic, as NaOH, wt% - 6.7
Sulfide Sulfur, as S, wt% - 0.1
RSH, as S, wt% - 1.7
Phenols – none detected
Sample also contains a few fine particulates that will settle to the bottom over a period of time.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Dan Bowman
Cc: Gary Lenertz, Bo Cumberland

Date: 01/25/08

From: Miles Root

Lab Memo: 08-012

Subject: **Nov Rig Solutions Sample Evaluation 0108-55**

A sample of waste water from Nov Rig Solutions, sample evaluation 0108-55, has been evaluated to determined the type of treatment it will need upon arrival for processing at CES. The source of this stream is a pressure washing operation and the stream is to contain waste water and oil. This particular sample had a small oil layer and contained a small amount of particulates that settled to the bottom.

This material may be handled as waste water if it comes in with no visible oil layer. Any receipts with oil layers may be drained from the bottom to process the water separately sending the oil phase to the back for processing. The analytical results for the water show it to be acceptable. The results are below.

pH = 4.8
TOC = 2662 mg/L
Flash point > 140 deg F (run on top oily layer)
Phenols = none detected
Metals
Cd = 0.06
Cr = 0.27
Cu = 0.09
Ni = 0.10
Zn = 1.1

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Bo Cumberland

Date: 01/25/08

From: Miles Root

Lab Memo: 08-011

Subject: **<u>TEPPCO Crude Tank Bottoms Sample Evaluation 0108-26</u>**

A sample of crude tank bottoms from TEPPCO, Texas City been evaluated to determine the amount of diesel that it must be mixed with in order to make the material fluid. The sample is mostly solids with some liquid material present. The solids were used for the testing.

A portion of the solids was mixed with regular diesel fuel and heated until fluid. Best results are obtained using a minimum of 46 % diesel measured as volume% to weight. The sample was heated to around 160 deg F and stirred until all of the material became fluid. Upon cooling down to room temperature the sample became very viscous and thick, but remained homogeneous. It will take considerable mixing to solubilize the solids, but it can be done with the diesel at what is essentially a 1:2 mixing ratio of diesel to solids.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman
Cc: Gary Lenertz
From: Miles Root

Date: 01/17/08

Lab Memo: 08-008

Subject: **Enterprise KOH Stream - Sample Evaluation 0108-35**

A sample of potassium hydroxide from Enterprise Products, Port Allen, LA has been evaluated as a potential sale to Deridder. The sample is dark from suspended particulates, but contains no oils by centrifuge. Solids by centrifuge are approximately 1.5 vol%. The sample also has an odor of ammonia. The KOH concentration was determined by titration to pH 7.0 with the MW of 56 used instead of the 40 as used for NaOH samples.

A summary of the test results follows:

Specific Gravity – 1.203 @ 15.5 deg C
KOH – 20.7 wt%
Oil, by centrifuge – none detected
Solids, by centrifuge – 1.5 vol%
Sulfides – present
Ammonia odor present in sample.

As a side note, the CRC Handbook lists the percentage of a pure KOH solution in water as 22.0 wt% with a density of 1.2035 @ 20 deg C, indicating that our testing method is not too far off.

CES Environmental Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Matt Bowman
Cc: Gary Lenertz, Bo Cumberland

Date: 01/14/08

From: Miles Root

Lab Memo: 08-005

Subject: **Southcoast Terminals Sample Evaluation 0108-25**

A sample from Southcoast Terminals has been evaluated as a potential incoming material for processing. Overall, this material is not suitable for processing at CES due to its low flash point, making it a hazardous waste, but it can be sent to Texas Molecular.

The sample from Southcoast Terminals is labeled as "T-019, waste water, WFE-B Distillate, 01/10/08" and is the result of cleaning the tank with soap and water. I assume WFE to be a wiped film evaporator unit of some type. An overview of the testing completed is as follows:

pH = 2.9
Solids by centrifuge = none detected
Oils by centrifuge = none detected
Flash point > 110 and <115 deg F
Specific gravity = 1.010 at ambient temperature

Test results show material to be suitable for handling at Texas Molecular without issues.

CES Environmental
Services, Inc.

4904 Griggs Road
Houston, TX 77021
Tel. (713) 676-1460
Fax. (713) 676-1676

To: Gary Brauckman
Cc: Gary Lenertz, Bo Cumberland

Date: 01/03/08

From: Miles Root

Lab Memo: 08-001

Subject: **Basell Bayport – Evals #1207-23 & 24- Update Report**

This is an update for additional testing done on the two samples from Basell, Bayport. These are two mineral oil samples with minor impurities.

Additional testing was done on an equal volume composite of the two samples. A portion of sample was distilled to 300 deg C with only a single drop of liquid observed to condense into a Dean Stark sidearm trap. A closed cup flash point on the pot sample after the distillation was greater than 140 deg F. An ash run on the same sample was 0.77 wt%.

This completes the known requested testing for these two samples.